













# THE ORCHIDS OF BURMA

*(Including the Andaman Islands)*

DESCRIBED.

COMPILED FROM THE WORKS OF VARIOUS AUTHORITIES

BY

CAPTAIN BARTLE GRANT,

*The Border Regiment,*

*Adjutant, Rangoon Volunteer Rifles.*



Rangoon:

PRINTED AT THE HANTHAWADDY PRESS,

1895.

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# ERRATA.

Page	1	Line	10 for	<i>Iedeni</i>	read	Sedeni.
"	"	"	11	" <i>Leden</i>		Seden.
"	13	"	3	" <i>Pinati</i>		<i>Pinnati</i> .
"	"	"	6	" <i>Bipinati</i>		<i>Bepinnati</i> .
"	"	"	9	" <i>Tripinati</i>		<i>Tripinnati</i> .
"	"	"	35	" <i>Ocellated</i>		<i>Ocellated</i> .
"	19	"	3	" anther		anther.
"	20	"	28	" Rostock		Rootstock.
"	"	"	29	" acuminate		acuminate.
"	32	"	2	" bractiate		bracteate.
"	38	"	2	" acuminate		acuminate.
"	40	"	23	" B. Khasyanum	read B. Khasianum, Griff ; and add	
					below, B. Khasyanum, Rehb. f. See <i>B. repens</i> .	
"	48	"	28	dele, not given in Hooker's Fl. Brit. Ind.	<i>B. G.</i> and	
					insert, See <i>Cirrhopetalum simillimum</i> .	
"	55	"	1	for <i>Chirropetalum</i>	read	<i>Cirrhopetalum</i> .
"	"	"	18	for <i>belpharistes</i>	read	<i>blepharistes</i> .
"	59			C. Simillimum add, SYN	<i>Bulbophyllum simillimum</i> , Par.	
"	63			line 21 for biggibous	read	bigibbous.
"	81	"	2	read, Leaves 2 -3.		
"	146	"	22	for <i>D. pulchella</i>	read	<i>F. pulchella</i>
"	162	"	12	for Rolf	"	Rolfe.
"	182			after line 21 add, Referred to sect. <i>Pleione</i> by its anther with		
				which it has nothing in common.	<i>Hook. f.</i>	
"	234			line 4 for B. apetioides	read	B. aporoides.
"	"	"	24	" Rolf,	"	Rolfe.
"	256	"	15	after, erect, insert, flowers, and to V. parviflora add, Var.		
				testacea ; sepals and petals brown. SYN.— <i>V. testacea</i> ,		
				Rehb. f. in Gard. Chron. 1877, 166 ; <i>Erides testaceum</i> ,		
				Lindl. Gen. and Sp. 238 ; Paxt. Fl. Gard. ii. t. 142 ;		
				Walp. Ann. v. 897.		
"	261	"	2	for 1 in.	read	1. fl.
"	269	"	16	" lilacs	read	lilac.
"	274			Above <i>Æ. Virens</i> insert <i>Æ. testaceum</i> , See <i>Vanda parviflora</i> ,		
				Var. <i>testacea</i> .		
"	275			line 19 for O. cubefarum,	read	O. cubepharum.
"	278	"	15	" S. biggibum,	"	S, bigibbum.
"	288	"	30	" Uncifera	read	Uncifera.
"	293	"	16	" S. densiflorum	read	S. densiflorus.
"	326	"	21	" convenient	"	connivent.

*Note.*—The initials C. P. in this work refer to the drawings of the Revd. Charles Parish.



## PREFACE.

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When I commenced to take up the study of Burmese Orchids, I found the want of a book of reference at a moderate price, suitable for a beginner's use, a serious obstacle to my progress. The larger works on Orchids, especially those with coloured plates, are very costly, and the various Libraries of Rangoon are by no means too well furnished with Botanical works of reference. The Orchids of Burma, again, form but a fractional part of this immense order of plants, the members of which are to be found in almost every part of the globe, tropical and temperate, and much time was expended in hunting out what I wanted from a large mass of unsuitable material. Veitch's Manual is, I am told, out of print, and William's Manual though of the greatest assistance, is a Florist's book and naturally treats only of such species as from their beauty are worthy of cultivation in an English Orchid house. *Hooker's Flora of British India*, parts V and VI treating of Orchideæ, gives undoubtedly the latest and best information obtainable, but the descriptions are purely technical and require a certain amount of Botanical knowledge to render them intelligible to a beginner.

I found the Rev. Charles Parish's article on Orchids in Theobald's edition of *Mason's Burma* more useful than anything else as a starting point, though, of course, his list of Burmese species is now very incomplete. This careful and accurate observer, whose drawings of Orchids have, I believe, never been surpassed, enjoyed exceptional advantages in the study of these

## PREFACE.

plants, having been stationed, as he himself says, for over 20 years in one spot, Moulmein, where living specimens of almost every kind named by him in his list were the subject of daily attention.

I have endeavoured in this work to meet the requirements both of Students and Amateurs : the descriptions of " Florists " kinds most interesting to the latter, are as simple as is consistent with accuracy, and are taken mostly from William's, Parish's and Veitch's works, while *The Flora of British India*, *The Botanical Magazine*, *The Kew Bulletin*, &c., furnish those of such kinds as are of purely Botanical interest. I venture to think that the Index of technical terms, giving an explanation of every scientific expression used in this book, will be found a useful feature. Hints on the treatment of Orchids in India, potting, mounting and watering, are also given.

As to the classification and arrangement, broadly speaking the system adopted is Lindley's, while the Nomenclature is Hooker's. In an Appendix, and in the key following at the end of the description of each genus, to be read in conjunction, I have also given the classification of the *Flora of British India*, for the use of students who may prefer to follow Hooker's system.

As information as to the localities where the different species of Orchids are to be found, and the seasons at which they flower, cannot fail to be of value, I have given some forms at the end of the book which can be filled up from time to time, and sent to me for use should a second edition of this work be called for. I cannot hope that no omissions nor mistakes, printers or otherwise, are to be found in the volume, in spite of every care in its preparation, and I shall be sincerely grateful to any one who will bring those he discovers to my notice.

BARTLE GRANT.

*Rangoon 1895.*

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## NOMENCLATURE OF ORCHIDS.

IN every case two names are given, the first of which indicates the "genus" to which the plant belongs, the second describes the peculiarity which distinguishes it from the other members of that group, and may be descriptive of the habit of the plant or appearance of the flower, or have been given in compliment to some distinguished person, or in commemoration of the name of the discoverer or person by whom the plant was first flowered in England. The rule for these last cases, as laid down by Sir Joseph Paxton, is, that when the plant is named after its discoverer or introducer, it is Latinized with the use of the genitive case terminating in "*æ*" or "*i*," as for example "*Cypripedium Ledeni*"—in English Mr. Leden's *Cypripedium*; but when the name is given in compliment only to some eminent person who is not actually the discoverer or introducer, the accusative case should invariably be used, as in "*Dendrobium Cambridgeanum*," which flowered at Chatsworth for the first time in England when the Duchess of Cambridge was visiting the then Duke of Devonshire in 1838. When a plant has been botanically described and named, it is an understood rule that the name so given shall hold good.

Mere varieties of size and colour are not considered sufficient to warrant a separate specific name, but such are usually indicated by the addition of a *third* name, as *Phalænopsis grandiflora aurea*, which is in allusion to the deeper golden colour of the flower than in the ordinary *Ph. Grandiflora* which it resembles in every other particular.—*Jennings*.



## GENERAL MANAGEMENT.

## I.—POTTING AND MOUNTING.

The hints given below, taken from the work by Mr. Samuel Jennings, late Vice-President of the Agri-Horticultural Society of India, will be found of the greatest use to those who grow Orchids in India and Burma.

As he observes, it by no means follows that the treatment of Orchids which meets with the best results in England is that which will afford the most satisfaction in India. The direct sun-light doubtless plays a most important part in perfecting the growth and deepening the colours of all tropical plants, and a great deal of the sun's influence is cut off from them when they are grown under glass; this is in a great measure proved from the fact that the same plants bloom with much richer colours in India than they do in England. In England many epiphytes are grown in baskets filled with fibrous peat; such treatment would be their ruin in a tropical climate, more especially when there is a great deal of atmospheric moisture.

The best season for re-potting and re-mounting is the cold weather when the plants are at rest, but the operation may be performed, if the plant is strong and healthy, at any time before the new and tender shoots make their appearance. There are times, however, when re-potting must be done irrespective of season altogether, as the lesser of two evils— that is, if the soil has become sodden or sour, or the pots infested with noxious insects; then with the utmost care break the old pot, and wherever the roots have attached themselves, allow the pieces of crock, &c., to remain planted in the new pot after thoroughly cleaning them. In such an event it is important to avoid touching the growing points of the roots, which upon examination with a microscope will be found to consist of numerous hollow cells, like a sponge; a light touch would be quite sufficient to break down their delicate walls and completely stop their development. The best pots for Orchids are made very shallow, with drainage holes all round the sides, but these are by no means so handy or sightly as pots of the ordinary shape.

In potting Orchids the first essential is perfect cleanliness: the plant, leaves, and roots should be thoroughly washed in lukewarm water, and

all soil and dirt removed, the dead roots cut off with a pair of scissors. The pot selected should not be too large for the size of the plant—over potting is a great mistake; it should be perfectly clean inside and out and all the pieces of broken crock used for drainage should also be well washed. Drainage must be complete; this is secured by placing about an inch of broken crocks at the bottom of the pot. The material for filling up should be a mixture of charcoal in lumps, and pieces of vitrified brick, called “jummah,” the refuse of brick kilns, broken to a convenient size, the larger pieces being placed below, and the smaller near the surface. When there is a considerable mass of fleshy roots, as is frequently the case in fine specimens of *Vanda*, *Arides*, and *Saccolabium*, it is sufficient to fill the pot, building the lumps carefully and firmly round the stem, till the roots are all covered, and finishing off with a top-dressing of moss. But if the plant has but little root, it is a good plan to fasten it securely to a small block of wood with copper wire, and sink the block in the potting material, covering all with moss as before. When it is necessary to have something more than lumps of charcoal about the roots of Epiphytal Orchids, the best material is moss, but when this is not procurable the dust beaten out of cocoanut fibre may be substituted, mixed with the lumps in the pots, but the drainage must be kept quite clear.

In all cases it is necessary to keep the crown of the plant quite free above the surface and the roots securely fastened. During the rains the top-dressing of moss should be removed. The above mode of treatment is recommended for all Epiphytal Orchids which like *Vandas* and *Arides* have no fleshy pseudo-bulbs. “*Phalenopsis*” and the more delicate kinds are best grown on blocks of hard wood, half sunk into potting material, so that the whole plant is above the surface, but protected with moss.

When it is desired to mount Orchids on blocks, a flat board of teak, sissoo, or other hard and durable kind should be used. Wet and white ants will very soon destroy mango wood. The wood should be selected free from holes or rough bark which gives cover to insects, and the wood should not be green. In mounting use small copper nails, which should be first driven into the board in the form of a square or triangle; then twist the end of a piece of thin copper wire round one of the nails; place a little fresh moss upon the wood and the root of the plant

carefully spread out over that, covering it up with a little more moss, fix it all firmly by passing the wire from nail to nail. Avoid the use of cocoanut fibre which soon becomes sour and harbours many destructive pests which feed on the young shoots. Almost all Epiphytal Orchids prefer basket to pot cultivation, as they delight to coil their roots round the woodwork, or to hang them loosely in the air though the open bars. These baskets are easily made: in shape they are best square, and as small as possible consistent with the size of the plant. Cut the bars of wood into even lengths, teak is the best; bore holes carefully at exactly the same distance from the ends; then take four lengths of sufficiently strong copper wire, one for each corner, fastening the ends to the lowest bar, building them up alternately to the right and left to form the basket; the upper ends of wire should then be brought together to form a handle by which the whole may be suspended. The bottom of the basket is formed by nailing similar bars across, leaving intervals for drainage and cultivation.—*Jennings*.

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## GENERAL MANAGEMENT.

### II.—CLEANLINESS AND WATERING.

It is needless to remark that without care and personal attention the Horticulturist will never succeed in bringing any plant to perfection, and this applies with peculiar force to the cultivation of Orchids. So much of the beauty of the plants depends upon the condition of the leaves, that too much care and attention cannot be bestowed upon them; more than this, unless the leaves are able to perform their proper functions, it is useless to expect the plants to grow in full health and vigor. This is especially necessary in the case of Epiphytal Orchids, which derive so much of their nourishment from atmospheric moisture imbibed by the ærial roots and elaborated by the leaves; it follows then that if their pores be choked up with dust and dirt, the leaves are rendered useless for the latter purpose. Hence the importance of frequently washing the leaves of the Orchids. This is best done with a soft sponge and soap and water, the ammonia in soap exercising a very beneficial effect, besides rendering it so much easier to remove impurities. They must however be very carefully handled as the surface of the leaf is very tender and liable to injury if rubbed too hard.

Another point to which it is necessary to give the most careful attention is the watering.

The water used should be a degree or so warmer than the atmosphere—as it usually is when first drawn from a well—but the best plan is to store rain water in a cistern, adding a little hot water if it is found to be too cold when required for use. It will be found by the use of warmed water, that the plants make stronger and more vigorous growth.

As to the best time for watering ; when but little is required, and the plants need it but once daily, it is preferable to water in the morning, before the sun becomes powerful, as then the plants are not likely to receive a chill about the roots from too much wet on a cold night. Then, as the days become hotter, and the atmosphere drier, twice a day water will be required ; the afternoon—just before sunset—will then be the best time to give the second supply. Direct midday watering should be avoided if possible, as there is always a danger that drops may be accidentally left upon the leaves, and should the sun's rays rest upon them, the drop acts like a lens, and a hole will be burnt in the leaf in consequence. Whenever it is necessary to supply moisture in the middle of the day, it is preferable to give water on the floors and walls, over the benches on which the plants stand, by the use of cus-cus tatties, or even by spreading tan upon the floors and keeping it well wetted.

Orchids which are grown upon wood will require much more water than those grown in baskets or pots, because the moisture is not retained so long about the roots ; these will bear syringing twice or three times a day when growing, and even an occasional good soaking under water will be found useful when the wood has become very dry.

Overhead watering is very refreshing to all plants after a dry, hot day, and the afternoon is the best time for this method. But the great danger to be apprehended is from an accumulation of water in the crowns of such plants as *Vandas*, *Saccolabiums* and *Cypripediums*, or on very tender young shoots. If the water is not removed with a sponge, rot may ensue, and the plant be ruined. For overhead watering, the syringe should have a very fine rose, and be used gently. Never syringe plants in bud or bloom,—*Jennings*.

## ORCHIDEÆ.

"The order owes its chief peculiarities to the following circumstances : 1st to the consolidation of all the sexual organs (*i.e.*, *stamens*, *pistils*, &c.,) into one common mass called the *Column* ; 2ndly, to the suppression of all anthers, except *one* in the mass of the order and *two* in *Cypripediæ* ; 3rdly, to the peculiar condition of its pollen, and the anther which contains it ; and 4thly, to the very general development of one of the inner leaves of the perianth in an excessive degree, or in an unusual form."—*Lindley*.

Such, shortly and technically stated, is the peculiarity of an Orchid flower : in order, however, to make all the parts of the flower clear to an inexperienced person, perhaps the simplest way will be to suppose that we have such a flower in our hand, and proceed to examine it in detail. Fortunately one of the largest and most suitable for our purpose is also one of the commonest and most easily procurable in Burma ; this is the lovely *Dendrobium Formosum*. We will take then, a specimen of this well-known flower in our hand, and examine it part by part.

First, we notice that it is seated at right-angles on a short round white curved *pedicel*, or stalk, which is thickened slightly upwards, *i.e.*, near the flower. This upper or thickened portion is really the germ, or as yet unfertilized seed-vessel, which if duly impregnated, will ultimately be developed into a large oval or pear shaped pod. Some orchids have little or no other footstalk than this germ.

If we next look at and count the segments of the flower, we shall find that they are six, including the lip as one. *Six* be it remembered is the normal number of such parts in all Orchids ; there are occasional apparent exceptions, but this is the rule. These six segments go by the general name of *perianth*, which means the flower envelope. ("The flower" of a plant, technically, being its sexual parts, and not the generally coloured parts commonly so called and forming its chief attraction).

Of this perianth the three outer segments will be seen to be oblong, pointed, and tolerably uniform in shape : these are the "*sepals*". Alternating with these are the three much larger and broader inner segments, which are the "*petals*". This name, however, in Orchids is mostly confined to the two upper, while the lower one is called "*the*

*lip*”—and is that part of the perianth which being “generally developed in an excessive degree, or in an unusual form,” constitutes one of the main characters of the order. We next observe, in the centre or axis of the flower, a short, thick, fleshy body; this is “the *column*”; and at its extremity, seated in a sort of cleft, a little cap or lid, which is the “*anther*”; and if we gently lift the lid (it is fastened by a hinge to the back of the column) there will probably fall out (for they are perfectly free) four small, yellow, hard, waxy bodies, either altogether or in two pairs; these are the “*pollen-masses*,” on the number and position and attachment of which the “diagnosis” of Orchids is made so largely to depend. Further, if we look just below the anther in front a small cavity with a viscid surface will be seen: this is the “*stigmatic surface*,” and the fertilization and development of the germ into a fully ripened capsule or pod depends entirely on the pollinia or pollen-masses coming in contact with it. And it is doubtless owing to the fact that the pollinia in *Dendrobium* are wholly free, and so easily fall out and away from the flower, that ripened pods are so rare in this genus as compared with some others, such as *Ærides* and *Saccolabium* whose pollinia are not free.

But we must not throw away our flower yet, for we have not quite finished its examination.

It was said that the three outer segments of the perianth, or sepals, were tolerably uniform; this, however, has reference to their upper part only, for it will be seen that the two lateral sepals are drawn out backwards (as is also the base of the lip), and have there become *connate*, *i. e.*, have grown one with the back part of the column, which is lengthened behind into a *horn or spur*. We have now noticed all the principal parts of an Orchid flower, and these are all to be looked for and found in nearly every Orchid, though it is not to be supposed that they will be always discovered as readily as in our typical flower.

Sometimes you will look in vain for six segments, and must be content with five, as in *Cypripedium*, where the two lower sepals are connate and form but one, and these two together often smaller than the upper one. Sometimes you may search in vain for the petals—for they may be so minute as hardly to be seen, as in *Monomeria* or wholly transformed into something else, as into a fringe in *Epiranthes*.

If again you should be fortunate enough to obtain that singular little gem *Drymoda picta*, you will wonder what in the world has become of the two lateral sepals, till, upon more careful inspection, you find them close to the lip, far away at the end of a long and unusual projection. This projection is the *mentum*.

The column, which in our *Dendrobium* was produced backwards into a horn or spur, is, in *Bulbophyllum* and other orchids, projected forward, in a greater or less degree, and then it is called a *mentum*. The column again, which is very short in some orchids is very long and prominent in others, as in *Cælogyne*. Lastly, the lip is variously attached to the column, sometimes being connate with its base, sometimes articulated or jointed with it, and this in a greater or less degree; so slightly, for instance, in *Bulbophyllum* as to shake tremulously with every movement of the flower. It is the lip also which assumes that endless variety of fantastic form and colouring which is familiar to those who have studied and cultivated this most singular and charming order of plants.

(From the Rev. C. Parish's article, *Orchideæ*, in Theobald's edition of Mason's "Burma.")

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## CLASSIFICATION.

THE classification here employed is taken from the Revd. C. Parish's *Systematic Arrangement of Burmese Orchids*, as set out in the article *Orchideæ* of Theobald's edition of Mason's "Burma."

This arrangement is based on Lindley's system, who made the main divisions of the order to depend on differences of the pollen-masses and their attachment. Lindley's arrangement as set forth in his *Genera and Species of Orchidaceous Plants* is as follows:—

### I. Anther one only.

#### A. Pollen masses waxy.

##### (a) No caudicula or separable stigmatic gland.

## Tribe I. MALAXEÆ or MALAXIDEÆ.

- (b) A distinct caudicula, but no separate stigmatic gland.

## Tribe II. EPIDENDREÆ.

- (c) A distinct caudicula, united to a deciduous stigmatic gland.

## Tribe III. VANDEÆ.

- B. Pollen powdery, granular or sectile.

- (a) Anther terminal, erect.

## Tribe IV. OPHREÆ or OPHRYDEÆ.

- (b) Anther terminal, opercular (lid like).

## Tribe V. ARETHUSEÆ.

- (c) Anther dorsal.

## Tribe VI. NEOTTEÆ.

## II. Anthers two.

## Tribe VII. CYPRIPEDEÆ.

The above arrangement which is that followed here will be found sufficiently simple for the Amateur's use. Parish remarks that he would be disposed to give the preference to Bentham's greatly modified arrangement in his paper "Notes on Orchideæ" read before the Linnean Society, January 20, 1882., and that he has only made one change in Lindley's description, that of adopting Bentham's term "stipes" for the appendage of the Pollinia of *Vandææ*; retaining Lindley's term *Caudicle* for that of *Epidendreæ*, as the former botanist has pointed out the necessity for a distinctive term for an organ which is so essentially different "both in origin and substance." \*

The following terms of frequent occurrence in the descriptions of plants are given below grouped together with reference to the parts to which they refer, these and other terms not here given will be found fully described in the Index of Technical terms.

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\* The latest classification of the order as set forth by Sir Joseph Hooker in the *Flora of British India* will be found in Appendix A.



Terms referring to the general outline of the lamina or blades of leaves. Many of these terms are also used in reference to the forms of petals, etc.

*Unequal*, When one side of the lamina is more developed than the other.

*Linear*, When nearly of the same breadth from the base to near the apex, narrow and with the two margins parallel.

*Acerose* (needle shaped), When a linear leaf terminates in a sharp, rigid point.

*Subulate* (awl-shaped), When the blade is very narrow and tapers from the base to a very fine point.

*Lanceolate*, 3—4 times as long as broad : broader in the centre than at the two extremities, tapering towards both base and apex.

*Oval*, or *Elliptic*, 2—3 times as long as broad with the ends equally rounded off.

*Oblong*, 3—4 times as long as broad with the ends equally rounded off.

*Ovate* (egg shaped), more or less rounded at the base and broader at this part than at the apex so that the whole is of the shape of an egg cut lengthwise.

*Obovate* (inversely egg-shaped), of the same figure as the above but with the apex broader than the base.

*Cuneate* (wedge-shaped), broad at the apex and abruptly pointed, tapering towards the base.

*Spathulate* (spatula-shaped), broad at the apex and rounded, tapering down to the base.

*Cordate* (heart-shaped), broad and hollowed out at the base into 2 rounded lobes, and more or less pointed at the apex ; the broadest part at the base.

*Obcordate* (inversely heart-shaped), of the same figure as the above but with the apex broader than the base, and hollowed out into 2 rounded lobes, base more or less pointed.

*Reniform* (kidney-shaped), resembles a cordate lamina but with apex rounded and whole blade broader than long.

*Lunate* (crescent shaped), reniform but with the lobes at the base pointed.

*Hastate* (halbert-shaped), blade broad and hollowed out at its base with 2 acute lobes placed almost horizontally or quite.

*Orbicular*, perfectly round.

*Sub-rotund*, rounded, approaching orbicular.

These terms may be used in combination to describe leaves which do not accurately agree with any of the above, as ovate-lanceolate, linear-lanceolate, cordate-ovate, roundish-ovate, &c., &c.

Terms referring to the 'form' of leaves, *i.e.*, their solid configuration ; including length, breadth, and thickness.

*Acicular*, needle-shaped.

*Ensiform*, sword-like.

*Acinaciform*, scimitar-shaped.

*Terete*, quill-shaped.

*Linguiform*, tongue-shaped.

*Ligulate*, strap-shaped.

Terms referring to the *apex* of the lamina.

*Obtuse* (blunt), when rounded or forming the segment of a circle.

*Retuse*, when obtuse with a broad shallow notch in the middle.

*Emarginate*, when the notch as in the above is sharp, or nearly triangular.

*Truncate*, when the lamina terminates very abruptly as if it had been cut across in a straight line.

*Præmorse*, if under the same circumstances the termination is ragged and irregular as if it had been 'bitten off'.

*Acute* (sharp pointed), when the apex is sharp so that the two margins form an acute angle with each other.

*Acuminate* (taper pointed), when the point is very long, and tapering.

*Cuspidate*, when gradually tapering into a rigid point.

*Mucronate*, when the apex, commonly rounded, ends abruptly in a short *point*.

Terms referring to the margin of the lamina.

*Entire*, if without any irregularity, perfectly even ; as in most orchids.

*Indented* (toothed), if irregular ; of which indentations there are several varieties as,

*Serrate*, if the teeth are sharp like a saw, and all point towards the apex.

*Serrulate*, minutely serrate.

*Bi-serrate*, if the teeth are themselves serrate.

*Dentate* (toothed), the teeth sharp with concave edges but not pointing in any particular direction.

*Denticulate*, finely dentate.

*Duplicate*, or *bi-dentate*, when the teeth are themselves dentate.

*Crenate*, the teeth rounded off with convex edges.

*Crenulate*, finely crenate.

*Bi-crenate*, when the teeth are themselves crenate.

*Sinuated*, when the margin presents alternate deep concavities and convexities.

*Undulated* (wavy), when the margin is slightly sinuous and wavy.

*Crisped*, or *Curled*, when very irregular, being twisted and curled (as in the endive).

*Incised*, when the margin is more deeply divided than by the above given indentations.

Of incisions also there are many kinds as,

*Fissure*, when the incision reaches to about midway between the margin and the midrib or mesial line.

—*fid*, the term for a fissure when used in combination. Thus a blade is

*Bi, tri, or multi,—fid*, according to the number of fissures.

*Lobes*, the division of the blade between 2 fissures.

*Partition*, when the incision reaches nearly to the base or midrib of the lamina.

—*partite*, the above used in combination, thus a lamina is

*Bi, tri, &c., —partite*, according to the number of partitions.

*Segments*, when the divisions reach quite down to the base or midrib.

*Dissected*, the lamina when divided by segments.

—*sected*, the above when used in composition, thus the lamina is

*Bi, tri, &c.*, —*sected*, according to the number of segments.

If the incisions are arranged featherwise the lamina, is said to be

*Pinati*, —*fid*, —*partite*, —*sected*, according to their depth.

If the divisions are themselves divided in a similar manner to the lamina itself it is said to be

*Bipinati*, —*fid*, —*partite*, —*sected* ; and

If the sub-divisions of these are again divided in a similar manner the lamina is

*Tripinati*, —*fid*, —*partite*, —*sected*.

*Lacinated* (slashed), or *decomposed*, if the lamina is still further divided.

*Pectinate* (comb-shaped), when the divisions are close and narrow like the teeth of a comb.

*Lyrate* (lyre-shaped), when the terminal lobe is large and rounded, and the lateral lobes also more or less rounded and becoming gradually smaller towards the base.

*Runcinate*, when the terminal lobe is triangular, and the other lobes of more or less the same shape having their points directed towards the base of the lamina.

*Panduriform* (fiddle-shaped), a lyrate lamina with but one deep recess on each side.

*Involute*, the margin rolled inwards towards the base.

*Convolute*, the margin rolled up towards the central line or midrib.

*Revolute*, the margin rolled outwards toward the base.

Terms which refer to the surface of the lamina.

*Carinate*, keeled.

*Glabrous*, entirely destitute of hairs.

*Hirsute*, covered with moderately stiff and long hairs.

*Tomentose*, covered with a not very thick coat of rather fine hairs, very dense and interwoven.

*Villous*, covered with long thick soft white hairs.

*Lamellate*, having thin plates.

*Pubescent*, covered with short thick soft hairs.

*Ocellated*, spotted.

*Clavate*, club-shaped.

*Urceolate*, pitcher-shaped.

*Papillose*, covered with knobbed or bladder-formed processes.

*Reticulated*, net veined.

Terms referring to the texture of the lamella.

*Coriaceous*, leathery.

*Glumaceous*, dry, scarious.

*Herbaceous*, thin, flaccid.

Other common terms.

*Glaucous*, of a whitish dusty green or blue colour.

*Adnate*, attached by the back.

*Axil*, of a leaf, the angle which its upper surface makes with the stem.

*Bract*, a covering leaf in the axil of which the flower is placed.

*Collateral*, side by side.

*Connate*, when 2 leaves, petals, &c., have become completely united in growth.

*Cucullate*, hooded.

*Deciduous*, a plant whose leaves fall off at certain seasons.

*Distichous*, leaves alternate on opposite sides of the stem.

*Epiphyte*, growing on other plants.

*Equitant*, set edgewise.

*Fimbriate*, fringed.

*Fusiform*, spindle-shaped.

*Imbricated*, overlapping.

*Incumbent*, back to back.

*Inflorescence*, the flower group.

*Mentum*, the prolongation of the column forwards into a "chin."

*Spur*, its prolongation backwards.

*Node*, that part of the stem from which a leaf springs.

*Opercular*, lid-like.

*Pedicels*, the separate stalks of the individual flowers.

*Peduncle*, the common stalk of the inflorescence.

*Perianth*, the flower envelope, *i. e.*, the parts surrounding the anther.

*Petiole*, leaf-stalk.

*Pollinia*, the pollen-masses.

*Pseudobulb*, false bulb, really leaf bearing stems.

*Raceme*, the peduncle bearing a number of flowers on separate stalks.

*Rachis*, the axis of the inflorescence.

*Rhizome*, root-stock.

*Scape*, a leafless flower stalk.

*Sepals*, the 3 outer segments of the perianth.

*Petals*, strictly the 3 inner segments of the perianth, usually however confined to the 2 upper, the lower one being called the lip and being usually distinct in form.

*Sessile*, without a petiole, stalk, &c.

*Setæ*, bristles.

*Striæ*, fine lines.

*Tetragonal*, 4-sided.

*Turbinate*, resembling a top or pear.

*Uncinate*, hooked.

*Versatile*, easily moved.

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## A. ANTHER ONE ONLY.

## I. Pollen-masses waxy.

## Tribe I. MALAXIDÆ.

Pollen-masses free, *i. e.*, without any caudicle or other connecting substance.

**MICROSTYLIS** Nutt.

Small terrestrial orchids with plicate wavy leaves, the sheathing bases of which combine to form a kind of false stem. Roots fibrous attaching themselves to half decayed leaves and other loose vegetable matter. Flowers small and inconspicuous, seated on a terminal erect stalk or rachis, commonly resupinate (*i. e.*, inverted in position). Pollen-masses 4, collateral (side by side). *Purish*.

**M. biloba**, see *M. Wallichii*, Var. *biloba*.

1. **M. Congesta**, Rchb. f. in Walp. Ann. vi. 206.

Leaves 3—6 lanceolate, bracts shorter than the very short pedicels, flowers minute, lip subquadrately ovate concave with a fold under the column and a 3-lobed apex.

Burma; The Andaman Islands. *Hook. f.*

*Stem* 2—6 in., stout. Base tuberous. *Leaves* 3—10 in., sessile or petioled, ovate elliptic or lanceolate. *Scape* with *raceme* 2—8 in., stout or slender; pedicel  $\frac{1}{8}$  in.; ovary trigonous and grooved; flowers  $\frac{1}{8}$ — $\frac{1}{10}$  in., yellow-green to pale brown or purplish. *Capsules*  $\frac{1}{8}$  in. crowded, erect. *Hook. f.* Fl. Brit. Ind. v. 690.

Ridley in Journ. Linn. Soc. xxiv. 334.

SYN.—*M. Bernaysii*, F. Muell. Fragment xi 21. *M. fusca* Rchb. f. l. c. 207. *M. trilobulata*, Kurz. Andam. Rep. App. B. xix.; N. E. Br. in Gard. Chron. 1883, 392. *M. flavescens*, Lindl. Gen. and Sp. 20; Ridley l. c. 337; C. P. 364. *M. fusca* Rchb. f. in Walp. Ann. vi. 207; *Dienia congesta*, Lindl. in Wall. Cat. 1936; Gen. and Sp. 22; in Bot. Reg. sub. t. 825; Rchb. f. in Bonpland, iii. 259. *D. fusca*, Lindl. Gen. and Sp. l. c. *Malaxis latifolia*, Smith in Rees Cyclop. *M. plicata* Roxb. Fl. Ind. iii. 456. *Crepidium flavescens*, Blume Bijdr. 388. *Neottia plantaginea*, Don. Prodr. 26, fid. Lindl. Gen. and Sp. 458.

**2. *M. Purpurea*.** Lindl. Gen. and Sp. 20.

A fine species with broadly ovate leaves 4—5 in. long and 2 in. or more broad, very much undulated, the upper surface of the leaves of a dark metallic crimson, the under surface and petioles pale reddish, metallic grey. Flowers yellowish purple. "*Williams*."

Burma; *Parish*.

Ridley in Journ. Linn. Soc. xxiv. 340; Hook. f. Fl. Brit. Ind. v. 687 (not given as Burmese); C. P. 356.

**3. *M. Polyodon*.** Hook. f. Ic. Plant. t. 2002.

Leaves 5 petioled elliptic, scape stout, bracts minute, auricles of lip broad erect, blade rounded or subquadrate pectinately toothed, column short, arms spreading.

Tenasserim; at Moulmein, *Parish*.

*Stem* short, stout, base tuberous. *Leaves* 3—5 in., exclusive of the broad petiole. *Scape* 4 in.; raceme 6 in., many fld; pedicels  $\frac{1}{3}$  in. *Flowers* yellow, about  $\frac{1}{3}$  in. across the sepals; disk of lip with a raised 3-lobed callus surrounding the central pit. *Hook. f.* in Fl. Brit. Ind. v. 688.

SYN—*M. Rheedii*. Reichb. f. in Trans. Linn. Soc. xxx. 138? (not of Wight, Lindl. or Willdonow). C. P. 215.

**4. *M. Scottii*.** Hook. f. Ic. Plant. t. 2001.

Leaves 2—5 sessile obliquely ovate acuminate crenate blackish brown with a broad pale dotted border, Scape elongate red, bracts reflexed, lateral sepals broadly oblong half the length of the linear-oblong dorsal and petals, lip green rhomboidly orbicular, auricles erect obtuse as long as the broad rounded blade which has a contracted 2-fid apex.

Pegu; at Rangoon, *Scott*.

*Leaves*. 3—4 in., falcate, 5—7 nerved from the base, most remarkable for their colouring. *Scape* 6—8 in. *Lip*  $\frac{1}{3}$  in. long and broad. A beautifully coloured species, which I have named after the late Mr. John Scott of the Calcutta Botanical Garden, who discovered it at Rangoon. It is eminently worth cultivating. Described from a drawing in Herb. Calcutt. *Hook. f.* Fl. of Brit. Ind. v. 687.



5. **M. Wallichii.** Lindl. in Wall. Cat. 1938. Gen. and Sp. Orch. p. 20. C. P. 115.

Leaves 2—4, bracts spreading shorter than the ovary, auricles of the lip acute or obtuse, blade with a rounded notched or bifid tip.

Andaman Islands, *Kurz*.

*Stem* 2—3 in. *Leaves* 3—5 in., sessile or petioled, ovate-lanceolate often discoloured. *Scapes* 3—8 in. *Flowers* about  $\frac{1}{2}$  in. long, greenish purplish or yellowish; sepals oblong, dorsal 1—3-nerved, lateral 3—5-nerved; petals 3-nerved; auricles of lip very variable. The Andaman specimen has an acute lip.

Ridley in Journ. Linn. Soc. xxiv 337.

SYN.—*Malaxis acuminata*, Don. Prodr. 29 (note in Herb. Wall.)

A very variable plant if, as I think the following are varieties *Hook. f.* in. Fl. Brit. Ind. v. 636.

Var. *biloba*; bracts usually longer, pedicels shorter, blade of lip contracted below the level of the column, tip bifid, arms of column larger. SYN.—*M. biloba*, Lindl. in Wall. Cat. 1940; Gen. and Sp. 20; C. P. 115; Ridley l. c. 337.

Var. *brachycheila*; Leaves lanceolate, auricles acute, blade very short with a forcipate tip. Moulmein, *Parish*.

Var. *omphaloides*, Leaves more unequal at the base, auricles of lip rounded and overlapping, Ridley l. c. 338.—Moulmein, *Parish*.

## KEY TO SPECIES.

MICROSTYLIS, \* *Nutt.*

Terrestrial or epiphytic, pseudobulbous or not. *Leaves* 1 or more, continuous with their sheath. *Flowers* small, in terminal racemes, resupinate. *Sepals* spreading or recurved. *Petals* as long slender. *Lip*

See Appendix A. Genus 2.

adnate to the foot of the column, usually flat, sides often produced upwards beyond the column as broad or long auricles. *Column* very short, with short spreading arms, anther sub-terminal, pollinia 4.

\* Sides of the lip produced upwards into large auricles.

† *Apex of the lip entire or notched, not serrate or pubescent.*

No. 2 ; *M. purpurea* ; No. 4 ; *M. Scottii* ; No. 5 ; *M. Wallichii*.

†† *Blade of lip toothed or pectinate.*

No. 3 ; *M. Polyodon*.

\*\* Sides of the lip not produced upwards into auricles.

† *Lip quite entire, or bearded at the tip only.*

No Burman species.

†† *Lip 2 - 3-lobed or cleft.*

No. 1 ; *M. Congesta*.

††† *Lip Crenulate, toothed or pectinate.*

No Burman species.

### LIPARIS, *L. C. Richard*.

Also inconspicuous plants, in general appearance resembling those of the preceding genus, but differing in the structure of the flowers. Pollen-masses 4, collateral.—*C. Parish*.

1. **L. bis-striata.** Par. and Rehb. f. in. Trans. Linn. Soc. xxx.

7155 ; C. P. 80.

Pseudobulbs elongate, leaves 2, 2—4 in. elliptic-oblong or lanceolate, scape longer than the leaves bracteate stout margined or winged, bracts lanceolate equalling the ovary, sepals oblong-lanceolate obtuse, sides revolute, lip recurved panduriform 5-nerved, tip dilated broadly truncate, calli 0, column slender incurved, wings usually hooked.

Tenasserim, *Parish*.

*Pseudobulbs* stem-like, 4—6 in., cylindric.

*Leaves*  $\frac{3}{4}$  in. broad, obtuse or apiculate, many nerved, coriaceous, base narrowed. *Scape* 4—6 in., bracts  $\frac{1}{4}$  in.; flowers yellowish; lip undulate, sides with obscure rounded lobes, base auricled; side nerves branching. *Hook. f.* Fl. Brit. Ind. v. 702.

Ridley l. c. 288; *Hook. f.* Ic. Pl. t. 1858.

**2. *L. Condylolobon.*** Rchb. f. in Hamb. Gartenzeit. 1882 (? 1862), 34; C. P. 71.

*Leaves* 2—8 in. linear-oblong, scape short, raceme dense-flid., flowers, minute very shortly pedicelled, bracts as long as the short pedicels, sepals obtuse 1-nerved, lateral revolute, lip recurved oblong with an entire rounded tip fleshy nerveless, calli O, column slender, wings small.

Tenasserim; at Moulmein, *Parish.*

*Pseudobulb* 1—2 in., narrow. *Leaves* 1 in. broad, 7-nerved. *Scape* with raceme 6 in. Much resembling *L. Gladiata* (*non Burman*), and with flowers yellowish when dry of the same size, but the bracts are longer, slender and membranous, and the lip is very different. The above is from Reichenbach. Ridley makes it a synonym of the Javan *L. parviflora*, but it differs *in toto* from the description he gives of that species. *Hook. f.* in Fl. Brit. Ind. v. 704.

SYN.—*L. parviflora*, Ridley in Journ. Linn. Soc. xxii. 296.

**3. *L. disticha.*** Lindl. in Bot. Reg. sub. t. 882.

Leaf solitary 5—10 in. coriaceous linear, scape naked, sepals oblong-ovate acute 3-nerved, lip recurved, lateral lobes rounded and inflexed at the base, midlobe orbicular-ovate obtuse, column very short erect dorsally compressed with very broad coriaceous wings dilating downwards.

Tenasserim; at Moulmein, *Parish.*

*Roststock* slender, creeping; pseudobulbs distant,  $\frac{1}{3}$ — $\frac{2}{3}$  in., pyriform. *Leaves*  $\frac{1}{3}$ — $\frac{1}{2}$  in. broad, acuminate. *Scape* usually shorter than the leaves, stout, margined or winged; raceme  $\frac{1}{2}$ —2 in., rachis flattened; bracts  $\frac{1}{6}$ — $\frac{1}{4}$  in.; flowers  $\frac{1}{2}$  in., ochreous yellow. *Lip* fleshy, with a large basal callus. *Capsule*  $\frac{1}{3}$  in. long, pedicelled. *Hook. f.* in Fl. Brit. Ind. v. 706.

Ridley in Journ. Linn. Soc. xxii. 292; Miquel Fl. Ind. Bot. iii.

SYN.—*L. gregaria*, Lindl. Gen and Sp. 33 ; Thwaites Enum. 296 ; C. P. 332.

*L. mucronata*, Lindl. l. c. 32.

*Malaxis disticha*, Thouars Orchid. Isles Austr. d'Afrique. t. 89.

*Malaxis mucronata*, Blume Bijdr. 391 ; Moon Cat. 467.

4. **L. Jovis-pluvii.** Par. and Rchb. f. in Trans. Linn. Soc. xxx. 155 (? 154) ; C. P. 323.

Stem short, leaves 2—4 sessile or petioled ovate to lanceolate acuminate, bracts lanceolate, reflexed after flowering, flowers very small, sepals obtuse, lateral short falcately oblong obtuse 5-nerved, dorsal much longer lanceolate 3-nerved, lip recurved reniform crenulate base 2-tubercled, column incurved, wings short rather broad uncinat.

Tenasserim ; at Moulmein, *Lobb, Parish.*

*Stem* short, thickened, but hardly pseudobulbous below. *Leaves* 3—5 in., very membranous, 5-nerved, petiole broad if present. *Scape* 6—8 in., slender ; bracts slender,  $\frac{1}{3}$  in., and less ; flowers about  $\frac{1}{8}$ — $\frac{1}{6}$  in. diam. ; lip variable in breadth, narrowed into a very short 2-auricled claw. *Capsule* clavate.—Flowers in the rainy season, whence the name. *Hook. f.* in Fl. Brit. Ind. v. 697.

5. **L. lacerata.** Ridley in Journ. Linn. Soc. xxii. 284.

Pseudobulbs ovoid, leaves 2, 8—10 in., narrowly oblanceolate acuminate, scape slender laxly many-fl., bracts lanceolate shorter than the ovary, sepals straight, sides recurved, lip recurved from the broad base, then straight oblong 7-nerved, tip with 2 lacerate lobes, column slender incurved, wings small rounded.

Tenasserim ; at Mergui, *Griffith.*

*Pseudobulbs* 1 in., oblong or ovoid. *Leaves*  $\frac{2}{3}$ — $1\frac{1}{2}$  in., broad. *Scape* with the raceme 9—10 in. ; pedicels  $\frac{1}{3}$ — $\frac{1}{2}$  in. ; flowers  $\frac{1}{2}$  in. across, light pink ; lip red, contracted below the rounded shoulders. *Hook. f.* in Fl. Brit. Ind. v. 702.

6. **L. longipes.** Lindl. in Wall. Pl. As. Rar. i. 31. t. 35 ; Cat. 1943 (in part) ; Gen., and Sp. 40.

Leaves 2 linear obovate-oblong or oblanceolate, scape many-fl., bracts small lanceolate acuminate, flowers very many small white, sepals

obtuse at length revolute 1-nerved, lip recurved yellow broadly ovate subacute rather fleshy, calli O, column incurved wings rounded.

Not given as Burmese by Hooker. *B. G.*

*Pseudobulbs* short and ovoid, or long sometimes 6 in. and cylindric. *Leaves* 4—12 by  $1\frac{1}{2}$ — $1\frac{1}{4}$  in., obtuse, acute or acuminate, 5—7-nerved. *Scape* and *raceme* 6—10 in., with a few bracts below the flowers, slender. Variable in habit and foliage, but constant in inflorescence and flowers. The sepals are not acute as sometimes described.

The form with short pseudobulbs (*L. Spatulata*) occurs everywhere with the long-pseudobulbed, and intermediates abound. *Hook f.* in Fl. Brit. Ind. v. 703.

Parish gives both *L. longipes* and *spatulata* as distinct species, with references in the former case to Wallich. Pl. As. Rar. 35; Wights Icon. t. 906; Benth. in Fl. Hongk. 352; C. P. 318; and in the latter to Lindl. Bot. Reg. 1840, Misc. 189; Griff. 772; C. P. 101. *B. G.*

Ridley in Journ. Linn. Soc. xxii. 293 (Excl. Syn. *L. Elegans*, Lindl.); Wight. Ic. t. 906; Thwaites Enum. 295; Benth. in Fl. Hongk. 352; C. P. 318.

SYN.—*L. pendula*, Lindl. in Bot. Reg. 1838, Misc. 180; Regel. Ind. Sem. Hort. Petrop. 1868, 79.

*L. spathulata*, Lindl. in Bot. Reg. 1482.

? *L. nesophila* Rehb. f. 9. Ot. Hamb i. 56.

? *L. Boothii*, Regel Ind. Sem. Hort. Petrop. 1864, Suppl. 14.

## 7. *L. luteola*, Lindl. in Wall. Cat. 1944; Gen., and Sp. 32.

*Leaves* 2, 2—4 in., erect narrowly oblanceolate coriaceous, midrib stout, scape exceeding the leaves few-fl'd., bracts lanceolate, pedicels long, sepals subfalcate lanceolate subacute, margins revolute, lip recurved cuneate truncate apiculate, base auricled, calli 2 minute, column slender curved, wings obscure.

Upper Burma, *Griffith*. Tenasserim; at Moulmein, *Parish*.

*Pseudobulbs* densely tufted, very small, depressed globose. *Leaves*  $\frac{1}{6}$ — $\frac{1}{4}$  in., broad. *Scape* 2—4 in.; bracts  $\frac{1}{6}$  in., green; pedicels  $\frac{1}{3}$ — $\frac{1}{2}$ , in.; flowers  $\frac{1}{4}$  in. *Hook. f.* in Fl. Brit. Ind. v. 704-5.

Ridley in Journ. Linn. Soc. xxii. 289; Griffith Notul. iii. 277; C. P. 155.

**8. *L. olivacea*, Lindl. in Wall. Cat. 1942 ; Gen. and Sp. 27.**

Leaves 2 opposite sessile lanceolate acuminate plicate, bracts linear-lanceolate deflexed, sepals linear-oblong obtuse 5-nerved, lip flat orbicular subcrenulate, calli 2-tubercled, column rather stout slightly curved, wings very narrow.

Not given as Burmese by Hooker.

*Pseudobulb* small, pyriform ; stem 1 in. sheathed. *Leaves* 2½—3 in., spreading, 5-nerved. *Scape* 3—5 in. stout ; pedicels about ⅛ in. ; lip ¼ in. diam. suddenly contracted into a very short narrow neck, veined. I have seen only Wallich's 3 specimens. *Hook f.* in Fl. Brit. Ind. v. 694.

Ridley in Journ. Linn. Soc. xxii. 263 ; Wights Icon. t. 903 ; C. P. 367.

**9. *L. pachypus*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 155 ; C. P. 233.**

*Pseudobulb* large fleshy ovoid, leaf 1½—2½ in. sessile oblanceolate acuminate, scape short bracteate, bracts lanceolate shorter than the pedicels, sepals narrow obtuse straight, margins recurved, lip recurved cuneate, tip broad truncate retuse crenulate, nerves 5 outer branching, calli obscure, column slender, wings obscure.

Tenasserim ; at Moulmein, *Parish*.

*Pseudobulbs* tufted, ovoid, 1 in. or more long and as broad. *Leaf* ⅔ in. diam. sessile, thin, midrib slender, nerves obscure. *Scape* few-fl. ; bracts ¼ in. and less ; flowers about ⅔ in. across, yellow ? *Hook f.* in Fl. Brit. Ind. v. 700.

Ridley in Journ. Linn. Soc. xxii. 288.

**10. *L. Paradoxa*, Rchb. f. in Walp. Ann. vi. 218.**

Leaves 1—5 sessile erect alternate sheathing lanceolate acuminate, nerves strong, scape stout angular, bracts spreading ovate not reflexed after flowering lanceolate, flowers coriaceous, sepals short obtuse 5-nerved, lateral falcately oblong spreading and recurved, dorsal longer narrower, lip recurved cuneately obovate or obcordate, base 2-tubercled column incurved, wings narrow.

The type is not given as Burmese by Hooker.

Very variable in habit, 6—18 in. high ; stem tufted, base sometimes pseudobulbous. *Leaves* 2—8 in. rarely elliptic-lanceolate and narrowed into a broad petiole, membranous or subcoriaceous. *Scape* 4—10 in., naked or nearly so, rigid ; bracts variable in length,  $\frac{1}{6}$  in. and longer, not reflexed ; pedicels usually short and stout ; flowers about  $\frac{1}{3}$  in. across, yellow-brown ; ribs of ovary wrinkled. *Lip* variable in breadth sides erect. *Capsules* clavate.—I follow Ridley in accepting the name of *paradoxa* for this plant though as he points out, *L. odorata* is the oldest. The latter name is, as Thwaites states, inapplicable. *Hook f.* in Fl. Brit. Ind. v. 698,

Ridley in Journ. Linn. Soc. xxii. 261 ; C. P. 316.

SYN.—*L. odorata* Lindl. Gen. and Sp. 26 ; Thwaites Enum. 295.

*Empusa paradoxa*, Lindl. in Wall. Cat. 1937 A in part ; Bot. Reg. sub. t. 825 ; Gen. and Sp. 17 ; Miquel Prolus Fl. Jap. 135 ; Thwaites. Enum 426.

*Empusaria* Sp. Rchb. f. Conspect. 69.

*Malaxis lancifolia* Smith in Rees Cyclop.

*M. Odorata* Willd.—Rheede Hort. Mal. xii t. 28.

This has pure yellow flowers. There is another form found at Singapore with the above having the sepals and petals deep blackish-purple, and the lip green with a purple centre, this is the

*L. nervosa*, Lindl. Gen. and Sp. Orch. 24 ; Benth. Fl. Hongk. vi. 352 ; Franch. et Sav. Enum. Fl. Jap. ii. 21 ; Ridley in Journ. Linn. Soc. xxii. 262.

SYN.—*Ophrys nervosa* Thunb. Fl. Jap. 27 ; Ic. Pl. Jap. t. 10.

*Malaxis nervosa*, Swartz in Act Holm 1800, 235. *Sturmia nervosa*, Rchb. f. in Bonpland iii. 250. See Fl. Brit Ind. vi. 182.

Var. *Parishii*. See *L. Parishii*.

Parish gives in addition to *L. paradoxa* as above *L. paradoxa*, Rchb. f. B. Var. *Flavida*, Par. and Rchb. f. ; C P. 316 and 317, which may be perhaps *L. nervosa* but is more probably the following. B. G.

# 11. *L. Parishii*, *Hook f.* Fl. Brit. Ind. vi. 182 supplt.

Leaves 2—3 narrowed to the base or broadly petioled lanceolate acuminate, flowers fleshy, bracts small ovate acuminate, sepals oblong

obtuse 5-nerved, lip recurved obovate retuse, base with 2 teeth, sides flat, column suberect not winged.

Tenasserim ; *Lobb, Parish*. Upper Burma, *Herb. Calcutt.*

*Leaves* 2—3 in. *Scape* 6—8 in., naked, few-flid. ; bracts  $\frac{1}{8}$  in. ; pedicels  $\frac{1}{3}$  in. ; ribs of ovary not wrinkled ; flowers  $\frac{1}{2}$  in. diam. ; sepals spreading, dorsal longest ; petals deflexed, margins revolute ; lip thick, minutely erose beyond the middle ; basal teeth united by a curved ridge, nerves faint subconcentric. Very near *L. paradoxa* but pedicels longer, bracts smaller and sides of lip not erect—*Hook f.*

SYN.—*L. paradoxa*, var. *Parishii*, *Hook. f. l. c.* See *L. paradoxa*. Flowers yellow ? *B. G.*

**12. *L. Stenoglossa***, Par., and Rchb. f. in Trans. Linn. Soc. xxx. 154 ; C. P. 154.

*Leaves* 3—4 subradical petioled elliptic-lanceolate acuminate, scape slender lax-flid., bracts very long spreading lanceolate nearly as long as the ovary, sepals 5-nerved subacute, lateral spreading oblong-ovate, dorsal longer narrower, lip short reflexed cuneately obovate shortly broadly 2-lobed constricted above the middle, base 2-auricled and 2-tubercled, column incurved, wings very narrow.

Tenasserim ; at Moulmein, *Parish*.

*Stems* very short, tufted, base slightly swollen. *Leaves* 3—4 in., narrowed into a petiole  $1\frac{1}{3}$  in., or shorter. *Scape* slender, 5—6 in., bracts  $\frac{1}{3}$  in. ; flowers about as much across. *Lip* with a broad acute sinus at the broad tip. *Hook f.* in Fl. Brit. Ind. v. 697.

Ridley in Journ. Linn. Soc. xxii. 279.

**13. *L. Grossa***, Reichb. f. in Gard. Chron. 1883, i. 110 ; pseudobulbs short stout pyriform 2-leaved, leaves broadly ligulate obtuse tip unequal, raceme many-flid., rachis depressed, base with an acute compressed foliaceous sheath, and many scarious sheaths above, flowers yellow brown, bracts linear-cuspidate hardly equalling the pedicelled ovary, sepals ligulate acute, lip ligulate, base minutely obtusely auricled abruptly constricted in the middle, apex divergently 2-lobed, side lobes quadrate denticulate on the outer margin, basal calli obscure. *Ridley* in Journ. Linn. Soc. xxii, 288.—Burma, *H. Low*.—Allied to *L.*



*pachypus*, but much larger with a very different lip. *Description from Rchb. f. l. c.* I have seen no specimens. *Hook. f. Fl. Brit. Ind.* vol. v. p. 707. (Among doubtful species).

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## KEY TO SPECIES.

### LIPARIS, *Richard.* \*

Terrestrial or Epiphytic; pseudobulbous or not. Leaves 1 or more, membranous and continuous with their sheath, or thicker and jointed on the sheath or pseudobulb. Flowers small, in terminal racemes, resupinate. Sepals spreading, recurved or revolute, margins often revolute. Petals as long, very slender. Lip adnate to the base of the column, usually broad, deflexed from a very short base, or recurved. Column long, incurved margined or winged towards the tip, anther terminal, pollinia 4.

#### Section I. MOLLIFOLIÆ.

\* Lip broad, abruptly deflexed from very base, flat or with deflexed sides. Sepals narrow and petals with recurved or revolute margins; lateral sepals usually placed under the lip.

† *Leaf solitary.*

No Burman species.

†† *Leaves 2, rarely 3.*

*No. 8; L. Olivacea.*

\* \* Lip usually broad deflexed or recurved. Lateral sepal-spreading.

† *Bracts very small, short.* (See also *L. Paradoxa* and *brachyglottis*).

No Burman species.

†† *Bracts lanceolate.* (Shorter in *L. paradoxa* and *brachyglottis*).

*No. 4; L. Jovis-Pluvii; No. 10; L. Paradoxa; No. 11; L. Parishii. No. 12; L. Stenoglossa.*

#### Section II. CORIIFOLIÆ.

\* Leaf usually solitary on the pseudobulb. Lip as long as the lateral sepals or nearly so (when spread out).

† *Sepals 3-nerved.*

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\* See Appendix A. Genus 3.

No. 9; *L. pachypus*.

† † *Sepals 1-nerved*.

No Burman species.

\* \* Leaves 2 or more rarely solitary on the pseudobulb or stem.

Lip as long as the lateral sepals or nearly so (when spread out).

† *Sepals 3-nerved*.

No. 1; *L. bistrata*; No. 5; *L. lacerata*.

† † *Sepals 1-nerved*.

No. 2; *L. condylobulbon*; No. 6; *L. longipes*; No. 7, *L. luteola*

\* \* \* Lip minute much shorter than the sepals quadrate. Sepals straight or lateral subfalcate, margins revolute. A peculiar group of small species.

No Burman species.

### Section III. DISTICHÆ.

No. 3; *L. disticha*.

### **MALAXIS.** *Swartz.* (*Oberonia* of Lindley).

All the plants known to me (*i. e.* *Burman*) as belonging to this genus (*Malaxis*) come under the head of *OBERONIA*, which Lindley constituted a distinct genus; but Reichenbach (whom I generally follow) unites *Oberonia* with *Malaxis*.

The following short description is only applicable to *Oberonia*.—

Small stemless epiphytes, pendulous from trees, to which they are attached by fibrous roots. They are readily distinguished by their generally flat (somewhat rounded in *O. Myosurus*) fleshy distichous (two ranked) equitant (set edgewise), leaves which are broad and self clasping at their base, and taper to a point.

The flowers are minute, and seated on a rachis, which proceeds from the axis of the leaves, and somewhat resembles a rat's tail. Size from 3—6 in. or even a foot. Pollen-masses 4, incumbent (back to back). *C. Parish.*

I have retained the generic name *Oberonia*, in this work. *B. G.*

1. **Oberonia anceps**, Lindl. Sert. Orchid. under t. 8 ; Fol. Orch.  
6. Leaves ovate-oblong tip rounded, spike stout subsessile dense-flid., bracts short broad erose, petals small broad, lip truncate tip crenulate.

Tenasserim, *Parish*.

*Stems* 12—18 in., stout, tufted,  $\frac{1}{2}$ — $\frac{3}{4}$  in. across the leaves. *Leaves* suberect, subincurved. *Spike* 2—3 in.; flowers about  $\frac{1}{8}$  in. *Capsule*. sessile, globose, *Hook. f.* in Fl. Brit. Ind. v. 685.

SYN.—*O. imbricata*. Wight Ic. t. 1629 (not of Blume.)

*O. Griffithii*, Wight Ic. v. 4.

*Malaxis anceps*, Rchb. f. in Walp. Ann. vi. 214 ; C. P. 256.

2. **O. anthropophora**, Lindl. in Wall. Cat. 1951 ; Gen. and Sp. 16 ; Fol. Orchid. Oberon. 7.

Leaves narrowly linear, scape short sparsely bracteate, flowers very minute subwhorled, bracts ovate erose, petals linear, side lobes of lip rather broad decurved, midlobe elongate ending in two parallel tails.

Tenasserim ; *Wallich*.

*Stem* 2 in. *Leaves*  $\frac{1}{2}$ —2 by  $\frac{1}{4}$  in. *Scape* with raceme 6 in. ; flowers about  $\frac{1}{8}$  in. ; dorsal sepal small oblong, lateral much larger.—The specimens are very few. *Hook. f.* in Fl. Brit. Ind. v. 684.

SYN.—*Malaxis anthropophora* ; Rchb. f. in Walp. Ann. vi. 215 ; C. P. 58.

3. **O. brachystachys** ; Lindl. Sert. Orchid. (under t. 8) ; Fol. Orchid. Oberon 4.

Leaves short oblong obtuse thin, scape very short, raceme about equalling the leaves, bracts lanceolate, flowers whorled shortly pedicelled, petals broad erose, lip very short crenulate, lateral lobes large rounded terminal short truncate.

Tenasserim ; at Mergui, *Griffith*.

*Leaves* 1—2 by  $\frac{1}{3}$ — $\frac{1}{2}$  in. *Raceme* flexuous or decurved, rachis slender ; lower bracts longer than the flowers, which are about  $\frac{1}{8}$  in. *Fruit* pedicelled. *Hook. f.* in Fl. Brit. Ind. v. 677.

SYN.—*Malaxis brachystachys* Rchb. f. in Walp. Ann. vi. 211 ; C. P. 257. ; Lindl. Gen. and Sp. Orchid. (*vide ejusdem*).

**4. *O. Brunoniana*, Wight. Ic. t. 1622.**

Leaves linear-oblong very coriaceous, scape much flattened and adnate to the upper leaf, spike erect, rachis very stout, bracts lanceolate erose, flowers sessile densely imbricate, petals narrow, lip orbicular with a short terminal auricle.

Not given as Burmese by Hooker. *B. G.*

*Stem* rather elongate. *Leaves* 6—14 by  $\frac{3}{4}$ — $1\frac{1}{4}$  in., succulent. *Scape* 2—8 in.; adnate leaf 1—4 in., variable in position. *Spike* 4—6 in., like a rat's tail; flowers  $\frac{1}{8}$ — $\frac{1}{6}$  in.; lip dirty yellow, with an orbicular concave disk; terminal auricles variable. Some of Wight's specimens have much longer, narrower and more acuminate leaves than those figured in his *Icones*. *Hook. f.* in *Fl. Brit. Ind.* v. 681.

Lindl. *Fol. Orchid. Oberon.* 2.

SYN.—*Malaxis Brunoniana*, Rchb. f. in *Walp. Ann.* vi. 209; C. P. 287.

**5. *O. ensiformis*, Lindl. Fol. Orchid. Oberon. 4.**

Leaves very long coriaceous ensiform acuminate, scape subterete naked, spike dense-fl., bracts sheathing the flowers erose, petals broad erose, lateral lobes of erose lip broad rounded, midlobe obcordate. Not given as Burmese by Hooker. f. *B. G.*

*Leaves* 10—18 by  $\frac{1}{2}$ — $\frac{3}{4}$  in., narrowed to the tip. *Racemes* shorter than the leaves, nearly straight or curved; bracts tubular with truncate tips, perianth alone exerted, membranous; flowers about  $\frac{1}{30}$  in., orange-yellow; lip hardly longer than the sepals. *Hook. f.* in *Fl. Brit. Ind.* v. 679.

SYN.—*O. trilobata*, Griff. *Notul.* iii. 273. *O. acaulis* Hook. *Bot. Mag.* t. 5056 (not of Griff.). *Malaxis ensiformis*, Smith in *Rees Encyclop.*; Rchb. f. in *Walp. Ann.* vi. 212 (excl. Syn.); C. P. 288.

**6. *O. ferruginea*. Parish MSS.**

Leaves long, coriaceous narrowly ensiform falcate acuminate, scape short stout terete naked, spike shorter than the leaves, bracts broadly ovate subacute sheathing the subsessile flowers, petals linear-oblong fimbriate, lip short fimbriate, side lobes narrow short ascending, mid-lobe obcordate lobules rounded crenate sinus acute.

Tenasserim; at Maulmein, *Parish*.

*Leaves* 6—10 by  $\frac{1}{2}$ — $\frac{2}{3}$  in. *Scape* with raceme 4—5 in., bracts membranous; flowers about  $\frac{1}{10}$  in., perianth alone exserted; lip covered with large dots, side lobes acute or obtuse. *Hook. f.* in Fl. Brit. Ind. v. 679.

**7. *O. Griffithiana.*** Lindl. Sert. Orchid. t. 8 B; Fol. Orchid. Oberon. No. 44.

Stem elongate, leaves linear, scape slender naked, spike very slender, flowers very minute pedicelled more or less whorled, bracts lanceolate subentire, petals narrow linear, lip short 3-lobed, lobes subequal lacerate.

Pegu, *McLelland, Kurz.* Martaban and Tenasserim. *Griffith, Parish.*

*Stem*,  $\frac{1}{2}$ —3 in. (plant sometimes acaulescent.) *Leaves*, 1—2 by  $\frac{1}{8}$ — $\frac{1}{4}$  in., acute or obtuse, straight or falcate. *Scape* and *Spike* together 2—3 in., decurved; flowers pedicelled, purplish brown, about  $\frac{1}{10}$  in., sometimes in separate whorls; lip about equalling the sepals, midlobe irregularly lacerate or more or less 2-lobed. *Hook. f.* in Fl. Brit. Ind. v. 676.

SYN.—*O. Cimicina*, Griff. Notul. iii. 275; Lindl. Fol. Orchid. Oberon. 1.

*Malaxis Griffithiana* and *Cimicina*, Rchb. f. in Walp. Ann. vi. 208, 216; C. P. 59; 315.

**8. *O. Helferi*,** Hook. f. Ic. Plant. t. 1785 A.

Leaves small membranous ensiform acuminate, scape filiform naked, raceme about as long as the leaves filiform, bracts lanceolate, petals oblong obtuse, lip twice as long as the sepals linear-oblong with narrow lateral lobes and linear midlobe cleft to the base into 2 narrow parallel acute arms.

Tenasserim, *Helper.*

*Leaves*  $\frac{1}{2}$ —1 in., translucent when dry. *Scape* with raceme 1—2 in., erect or curved; flowers very membranous, loosely clustered, very pale, about  $\frac{1}{10}$  in. long. The narrow lateral lobes of the lip extend about half-way down, and end in an obtuse tooth. A very delicate species. *Hook. f.* in Fl. Brit. Ind. v. 679.

**9. *O. Iridifolia*, Lindl. Gen. and Sp. 15 ; Fol. Orchid. Oberon. 1.**

Stem short, leaves 3—5 in. broadly ensiform, spike long, slender, decurved, flowers not whorled sessile, bracts broad erose convolute sheathing the ovary, petals oblong erose, lip more or less quadrate deeply toothed tip broadly 2-fid.

Tenasserim, *Griffith, Parish.*

Very variable if, as I think probable, the following forms are correctly referred to it. The perianth alone is exposed from the broad sheathing scarious bract as in *O. ensiformis* and others. The rachis is stout or slender, the capsule sessile. There is such a mixture of specimens in a very bad state under Wallich No. 1948 that a reference to them is of no use.

*O. iridifolia proper*; leaves 6—10 by  $\frac{3}{4}$ —1 in., lip broader than long quadrate glabrous or pubescent.—Tenasserim.

Wall. Cat. 1948-2 (in part). Not the *iridifolia* of Bot. Mag. t. 4517, which is *O. tahitensis*.

SYN.—*Malaxis iridifolia*, Rchb. f. in Walp. Ann. vi. 208 ; C. P. 290.

Var. *brevifolia*; leaves 2—4 by  $\frac{1}{2}$ — $\frac{3}{4}$  in. falcate, scape and spike shorter, lip triangular glabrous tip broadly bifid.

Moulmein ; *Griffith, Parish.*

SYN.—*O. flexuosa*, Parish MSS.

*Hook f.* in Fl. Brit. Ind. v. 675 and vi. 180.

**10. *O. maxima*, Parish MSS.**

Leaves very long and broad, scape very stout, flowers sessile most densely imbricate round a thick straight rachis, bracts broad obtuse erose sheathing the subsessile ovary, petals short broad quite entire, lip orbicular crenulate, disk thickened.

Tenasserim ; at Moulmein, *Parish.*

This and *O. ensiformis* are the largest leaved species and this has the stoutest scapes, 3—4 by  $\frac{1}{4}$ — $\frac{1}{2}$  in., and thickest spikes, which are 4—6 in. long.

The flowers are appressed to the spike with very short ovaries. *Leaves* 12 by 1  $\frac{1}{2}$  in., nearly straight. *Hook.f.* in Fl. Brit. Ind. v. 677.

**11. *O. myosurus*, Lindl. in Wall. Cat, 1947 ; Gen. and Sp. 16 ; Fol. Orchid. Oberon. 8.**

Leaves 3—4 by  $\frac{1}{2}$  in. diam. linear terete curved, scape very short stout bractiate, spike very short dense-fl., bracts lanceolate denticulate, petals narrow linear, lateral lobes of lip rounded sinuate toothed, mid-lobe oblong-quadrate with toothed sides and 2 curved ascending spurs from each side of the truncate or retuse tip.

Moulmein, *Parish*.

A very singular plant. The leaves are described by Parish as papillose; the short stout scape is densely clothed with subulate bracts; the spike in the only specimen seen is less than  $\frac{1}{2}$  in. long, with crowded pale minute shortly pedicelled flowers which are shorter than the bracts. *Hook. f.* in Fl. Brit. Ind. v. 685.

*Hook. f.* in Ic. Plant. t. 1786 B.

SYN.—*Malaxis myosurus*, Walp. Ann. vi. 216; C. P. 300.

*Epidendrum myosurus*, Forst. Prodr. No. 317.

*Dendrobium myosurus*, Swartz in Nov. Act. Upsal. vi. 82.

**12. O. rufilabris**, Lindl. Sert. Orchid. t. 8 A; Fol. Orchid. Oberon. 5.

Leaves small narrowly oblong thin, scape short with many setaceous spreading bracts and rachis filiform, spike very slender flowers minute very shortly pedicelled in dense separate whorls, bracts setaceous, petals linear-oblong, lip longer than the sepals oblong with filiform lateral lobes close to the narrow base and 2 parallel short terminal lobes with recurved acute tips and a broad lobule in the sinus.

Burma, *Berkeley*; at Moulmein, *Griffith*.

Leaves 1— $1\frac{1}{2}$  in., acute or obtuse. Scape and raceme together 1—2 in.; flowers  $\frac{1}{3}$ — $\frac{2}{3}$  in.; lip red-brown; column with 2 subulate teeth. *Hook. f.* in Fl. Brit. Ind. v. 683.

SYN.—*Malaxis rufilabris*, Rehb. f. in Walp. Ann. vi. 213. C. P. 252, Lindl. Gen. and Sp. Orchid ( *vide* Ejusdem ).

## KEY TO SPECIES.

OBERONIA,\* *Lindley*.

Tufted epiphytes. Leaves distichous, equitant ensiform (very rarely terete). Flowers very minute in dense subcylindric spikes or

\* See Appendix A. Genus. I.

racemes. *Sepals* broadly ovate or oblong, subequal. *Petals* smaller. *Lip* sessile, concave, entire or 2—4-lobed. *Column* very short anther terminal, incumbent; pollinia 4, waxy, cohering by a viscus.

The flowers are generally 2 to each bract, which is lanceolate and free or broader and more or less convolute, sometimes very broad and forming a tube round both flowers; the upper flower has often a sheathing obtuse bracteole.—The genus wants a careful study of living specimens. I am far from satisfied with the following delimitation of species, the specimens being in some cases quite insufficient for a sure diagnosis.

### SECT. I. OBERONIA, PROPER.

\* Side lobes or all the lobes of lip deeply toothed or lacinate.

No. 7, *O. Griffithiana*; No. 9, *O. iridifolia*.

\* \* Lip entire or 3-lobed, margins quite entire or erose, never pectinate.

† Petals broad elliptic or ovate.

a. *Lip* quadrate or orbicular entire, or if lobed with the midlobe very small and short.

No. 3, *O. brachystachys*; No. 10, *O. maxima*.

b. *Lip* oblong or obcordate, longer than the sepals, side lobes undeveloped or minute, midlobe 2-fid.

No. 8, *O. Helferi*.

c. *Lip* deeply 3-lobed, side lobes broad or long, midlobe obcordate or 2-fid.

No. 5, *O. ensiformis*; No. 6, *O. ferruginea*.

† † Petals linear.

a. *Lip* orbicular or quadrate, entire or obscurely lobed.

No Burman Species.

b. *Lip* 3-lobed, side lobes large, midlobe much smaller.

No. 4, *O. Brunoniania*.

c. *Lip* with no side lobes, or very small or narrow ones, midlobe large or long.

No. 12, *O. rufilabris*.

d. *Lip* with broad or long side lobes and a large midlobe.

No. 2, *O. anthropophora*.



## Sect. II. SCYLLA.

No Burman Species.

## Sect. III. MYOSURUS.

No. 11, *O. Myosurus*.

## Sect. IV. CAULESCENTES

No. 1, *O. anceps*.**BULBOPHYLLUM.** *Thouars.*

A considerable genus of very uncertain limits, that is to say, it is made by some authorities to include several small groups of plants, which, in the opinion of others, should be separated from it ; and indeed have been so separated and received distinct generic names. It must suffice to say that *Bulbophyllum* as here defined, includes *Trias* and *Cirrhopetalum* of Lindley.\* These all agree in the following characters. They have a creeping rhizome or root-stock emitting rootlets from the under surface, on which rhizome are seated, at longer or shorter intervals, pseudobulbs (really leaf bearing stems), with a solitary leaf at their summit.

Occasionally, however, no apparent pseudobulb is developed at the base of the leaf, which then sits with a short foot-stalk closely on to the rhizome. In some cases, again, the pseudobulbs are so crowded as completely to conceal the rhizome. The inflorescence is various, but always, whether consisting of solitary flowers, or dense or umbellate heads or racemes, supported on a longer or shorter scape or leafless stalk, which arises from the base of the pseudobulb and derives its nourishment from it. The flowers have their small labellum or lip versatile, that is, easily moved, in consequence of its very light attachment to the prolonged base of the column, which column has two horns or arms projecting from the top, one on each side of the anther. The flowers of this genus, though for the most part small, are often very beautiful and highly curious, from the varied forms which their different parts assume.

\* These Genera have been kept separate in this work. B. G.

The pollen-masses are 4, in pairs, sometimes adhering but separable, sometimes connate, in which case one of each pair is very much smaller than the other. *Parish*.

**1. *Bulbophyllum Alicorne*.** Par. and Rchb. f. in Trans. Linn. Soc. xxx. 151; C. P. 260.

Scape slender, top decurved, spike drooping short dense-flid., bracts minute, flowers fleshy compressed, sepals subequal oblong obtuse 3-nerved, petals ovate-oblong 1-nerved, arms of column 3-branched.

Tenasserim, *Parish*; Burma, *Berkeley*.

*Rhizome* with annular pits at the leaf insertion. *Leaf* 2—3 in., sessile, oblanceolate or subspathulate, obtuse, very thick. *Scape* 4—5 in., sheaths small; spike 1—1½ in.; flowers ⅓ in. long; ovary and column very short. *Hook. f.* in Fl. Brit. Ind. v. 766.

**2. *B. alopecurum*,** Rchb. f. in Gard. Chron. 1880. ii. 70.

Like *B. triste* but larger, pseudobulb spherical, flowers shorter, sepals connate conchoid equal, petals and conchoid connate equal sepals nerveless.

Burma. (*Hort. Low*).

*Hook. f.*; in Fl. Brit. Ind. v. 770, (among species excluded and unknown).

**3. *B. auricomum*,** Lindl. in Wall. Cat. 1985; Gen. and Sp. 50.

This is the "ta-zeen-ban" of the Burmese. Pseudobulbs ovate 1 in. long. Flowers in a long pendulous raceme, small, white or golden-yellow, fragrant. When in flower the plant is leafless. *Parish*.

Rangoon, *Carey*; Tenasserim; Tavoy, *Wallich*; Moulmein. *Parish*.

Rchb. f.; in Trans. Linn. Soc. xxx. 152; C. P. 16. *Hook. f.* in Fl. Brit. Ind. v. 765.

SYN.—*B. fœnisecii*, Par. and Rchb. f.; in Bot. Zeit. 1865, 99.

*Dendrobium tripetaloides* Roxb. Fl. Ind. iii. 479.

**4. *B. calamaria*,** Bot. Mag. t. 4088; and Bot. Reg. 1843, p. 70, No. 109; C. P. 302. \*

Not given by Hooker in Fl. Brit. Ind.; compare *B. penicillium*, *infra*, *B. G.*

**5. B. Capillipes**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 150. t. 37 ? (tab. 30 A) ; C. P. 301.

Scape very short, pedicel very long slender pendulous, petals ovate obtuse 5-nerved rather shorter than the oblong dorsal sepal all much smaller than the broadly triangular ovate obtuse 7—9-nerved lateral sepals, lip very short pyramidal, basal angles acute.

Tenasserim ; at Moulmein, *Parish*.

*Pseudobulbs* 1 in., narrowly obpyriform. *Leaf* 3—4 in., subsessile linear. *Pedicel* 2—3 in. ; flowers  $\frac{2}{3}$  in. diam., yellow with red nerves ; lip violet-purple. Very like *B. uniflorum* in habit. *Hook. f.* in Fl. Brit. Ind. v. 755.

**6. B. Careyanum**, Spreng. Syst. Veg. iii. 732.

This is a common orchid in the vicinity of Moulmein—*F. M.* *Pseudobulbs* rather large, ovate ; leaf long strap-shaped. Flowers in a dense cylindrical spike ; small greenish purple. A worthless plant. *Parish*.

Khasya Hills and Burma, *Hook. f.*

Wall. Cat. 1990/1 ; Lindl. Gen. and Sp. 51 ; Walp. Ann. vi. 256 ; *Hook. f.* Fl. Brit. Ind. v. 760 ; C. P. 49.

SYN.—*Anisopetalum Careyanum*, *Hook. Fl. Exot.* 149.

*Pleurothallis purpurea*, Don Prodr. 33.

*Tribrachia purpurea*, Lindl. Coll. Bot. 41.

Var. *ochracea* ; flowers ochraceous unspotted, lip red-brown.

Arracan. *Hook. f.*

SYN.—*B. cupreum*. Bot. Mag. t. 5316 ; C. P. 193a.

**7. B. clandestinum**, Lindl. in Bot. Reg. 1841, Misc. 77.

*Stems* 6—12 in., as thick as a crow-quill ; internodes  $\frac{1}{4}$  in., sheaths appressed, ribbed. *Leaf*  $\frac{1}{2}$ —1 in., oblong or linear, retuse. *Scape* capillary ; bracts many, hyaline ; flowers  $\frac{1}{4}$  in. long, erect cellular, yellow-white. *Sepals* subequal, lanceolate caudate acuminate petals half as long, ovate-oblong, acute, 1-nerved ; lip shortly stipitate lanceolate, obtuse ; column short, 2-toothed. *Hook. f.* Fl. Brit. Ind. v. 753.

Tenasserim ; at Mergui, *Griffith*.

Walp. Ann. vi. 248.

SYN.—*Oxysepala ovalifolia*, Wight. Ic. t. 1736; Walp. l. c.; C. P. 84.

*Epidendrum sessile*, Koenig, in Retz. Obs. vi. 60 (ex Herb. Rottler).

? *B. trisetosum*, Griff. Not. iii, 283.

? *B. trisetorum*, Griff. Pl. As. t. 293.

**8. B. Comosum**, Collett and Hemsl. in Journ. Linn. Soc. ined.

Scape robust 2—3-sheathed, raceme inclined cylindric truncate, flowers most densely crowded  $\frac{2}{3}$  in. long horizontally spreading, sepals subequal hyaline subulate-lanceolate villous with flaccid hairs, petals small linear obtuse 1-nerved, lip shortly stipitate lanceolate recurved, columnar teeth short.

Eastern Burma; Shan Hills, alt. 6000 ft. *Collett*.

*Pseudobulbs* and *leaves* unknown. *Scape* 10 in., curved, as thick as a crowquill, kneed at the top so that the racemes form an angle of 45° with it. *Racemes* 2½ by 1½ in. diam., like a bottle brush, the flowers being perfectly horizontal and densely villous with unicellular\* hairs; bracts subulate, as long as the very short pedicel and ovary; sepals membranous, nerves 1—3 very slender. A very remarkable species, resembling no other, but allied to *hirtum* and *auricomum*. *Hook. f.* in Fl. Brit. Ind. v. 762-3.

**9. B. crassipes**, Hook. f.

Scape very stout, shorter than the pseudobulb concealed by ventricose sheaths, bracts sepals petals and lip as in *B. Careyanum*, but column longer with short erect spurs. *Hook. f.* in Fl. Brit. Ind. v. 760.

Martaban, *Wallich*; Arracan, (*Herb. Calc.*)

SYN.—*B. Careyanum*, Wall. Cat. 1990/2, Bot Mag. t. 4166.

**10. B. Cupreum**, Lindl.

Pseudobulbs 1 in. subglobose, scape slender inclined slightly curved, sheaths small distant raceme 1—2 in. flowers uniformly coppery

\* Discovered by Genl. Sir H. Collett, K.C.B., at Meiktila, Shan Hills, alt. 6000 ft.

The hairs of the sepals which were figured and described in the Linnæan Journal from dried specimens as unicellular, are multicellular. J. D. H. in Bot. Mag. t. 7283.

yellow, bracts ovate oblong much shorter than the ovary, lateral sepals ovate lanceolate acute, petals triangular-ovate acuminate, lip narrow obtuse auricles large, columnar spurs short slender.

Tenasserim, *Parish*.

Very like *B. Carey anum*, but the rhizome and scape are much more slender, the flowers fewer and less dense, and the petals are not aristate. *Hook. f.* in *Fl. Brit. Ind.* vi. 188.

Walp. *Ann.* vi. 257 ; *Rchb. f.* in *Trans. Linn. Soc.* xxx. 152 ; *Lindl. in Bot. Reg.* 1838, Misc. 95.

Parish has mixed up this plant with *B. Carey anum* Var. *ochracea*, his reference C. P. 193a may be to the above. *B. G.*

*B. Cupreum* Var. *Stenopetalum* ("vel." *Stenosepalum*, *Par.*) See *B. rufinum*.

### 11. *B. cylindraceum*, *Lindl. Gen. and Sp.* 53.

Scape tall with usually a large upper sheath, spike erect cylindric, flowers imbricate, bracts small, dorsal sepal triangular much smaller than the oblong obtuse lateral, petals small oblong 1-nerved, lips ovate, columnar spurs short erect.

Flowers dorsally flattened, white, pink, or deep purple—lip green or purple. From *Hook. f.* *Fl. Brit. Ind.* v. 765.

Non Burman.

Wall. *Pl. As. Rar.* i. t. 69,

Var. *Khasiana*, upper sheath smaller distant from the spike. *Hook. f.*

SYN.—*B. Khasianum*, *Griff. Notul.* iii. 284 ; *Rchb. f.* in *Gard.*

*Chron.* 1878, ii. 716 ; C. P. 82a.

Not given as Burmese by Hooker, but named in Parish's list. *B. G.*

### 12. *B. Day anum*, *Rchb. f. Gard. Chron.* 1865, 434 ; *Xen. Orchid.* 128, t. 144.

Scape O, pedicel very short sigmoid, flowers ciliate with long hairs, petals oblong much smaller than the broadly ovate obtuse equal sepals, lip sessile trigonous sharply toothed, basal auricles uncinately incurved columnar teeth short.

Tenasserim ; at Moulmein, *Parish*, &c.

*Pseudobulbs* 1 in., crowded. Leaf 3 in., elliptic, reddish beneath; petiole short. *Flower* 1 in. diam.; sepals green, streaked with purple specks; petals blood-red, margins yellow; lip green, disk with blood-red ridges. *Hook. f.* in Fl. Brit. Ind. v. 756.

Bot. Mag. t. 6119; Rchb. f. Xen. Orchid. ii. t. 144; Fl. des Serres t. 2236; Saunders Ref. Bot. 115. C. P. 358.

### 13. *B. epicrianthes*, Hook. f.

*Rhizome* ascending, as thick as a crow-quill; pseudobulbs  $\frac{1}{2}$  in., narrow. *Leaf* 1 in., sessile, elliptic-oblong acute coriaceous. *Scape*  $\frac{1}{4}$  in., 1-fl.; bracts lanceolate; flowers green and red; sepals about  $\frac{1}{4}$  in., subequal, ovate-lanceolate, spreading; threads of petals nearly as long; lip sessile, ovate-lanceolate, acute, warted, base 2-lobed; column truncate. Described from a drawing and notes of Parish. I assume he is right in referring this plant to Blume's *E. javanica*; he describes the threads of the petals as 6, in threes, membranous, Blume as 7, fleshy. There being a *Bulb. javanicum*, I have adopted the generic name for the specific. *Hook. f.* in Fl. Brit. Ind. v. 753.

Tenasserim; at Moulmein, *Parish*.

SYN.—*Epicrianthes javanica* Blume Bijdr. 306 (*Epicranthes*); Fl. Jav. Præf. vi.; Lindl. Gen. and Sp. Orchid. 61; Miquel Fl. Ind. Bat. iii. 654.

One species only known. In habit a *Bulbophyllum* differing however in having a fringed membrane in the place of petals and only 2 pollen-masses. For further description see *Otia Botanica* Rchb. f. Fasc. I. p. 487. No. 25, Hamb. 1878, *E. Javanica*. *Parish*.

C. P. 351.

### 14. *B. gracile*, Par and Rchb. f. in Trans. Linn. Soc. xxx. 152, (not of Thouars); C. P. 208.

Scape and elongate suberect raceme filiform, flowers minute subglobose glandular and villous, dorsal sepals oblong shorter than the orbicular-ovate obtuse 3-nerved lateral, petals linear obtuse 1-nerved, lip subsessile oblong-lanceolate obtuse, columnar spurs slender incurved.

Tenasserim ; on Moolee-it, alt. 3000 ft. *Parish*.

*Pseudobulbs*,  $\frac{3}{4}$  in. diam., subglobose, tubercled (when dry), young 2-leaved? *Scape* with lax-fl'd. raceme 6 in. ; bracts setaceous, longer than the very short pedicels ; flowers  $\frac{1}{8}$  in., green mottled with brown. *Hook. f.* in Fl. Brit. Ind. v. 762.

Rchb. f. in Gard. Chron. 1874, ii. 162.

**15. *B. hirtum***, Lindl. in Wall. Cat. 1989 ; Gen. and Sp. 51 ; Bot. Reg. xxxii. (184), under t. 66.

*Scape* tall stout, spike long many-fl'd. drooping, flowers sessile tomentose, dorsal sepal lanceolate 3-nerved rather shorter and narrower than the broad-based falcately-lanceolate 3-nerved lateral, petals small oblong obtuse ciliate, lip subsessile clawed linear-oblong truncate hispid below the middle, columnar spurs short.

Tenasserim, *Parish*.

*Pseudobulbs* 1—1½ in., ovoid oblong, terete, 2-leaved. *Leaves* 1—2, 4—8 in., oblong to lanceolate, obtuse, rather thin. *Scape* with spike 8—12 in. ; flowers  $\frac{1}{4}$ — $\frac{1}{3}$  in long, yellow or greenish white, scented of *Anthoxanthum*, bracts ovate, acute, exceeding the ovary ; pollinia globose, 1 pair minute. *Hook. f.* in Fl. Brit. Ind. v. 762.

SYN.—*B. suave*, Griff. Notul. iii. 292.

*Stelis hirta*, Smith in Rees. Cyclop. xxxiv.

*Tribrachia hirta*, Lindl. Collect. 41.

***B. khasyanum*** see *B. cylindraceum* Var. *khasiana*.

**16. *B. lemniscatum***, Parish MSS. ; in Bot. Mag. t. 5961 ; C. P. 211.

*Scape* erect slender or thickened upwards, spike short pendulous, flowers minute globose villous, sepals orbicular-ovate connate below, midrib of each below the apex with a long slender pendulous appendage, petals linear-oblong obtuse 1-nerved, lip sessile short obtuse purple, columnar spurs stout incurved.

Tenasserim ; at Zwabakir in Moulmein, *Parish*.

*Pseudobulbs*  $\frac{3}{4}$  in diam., crowded, globose, strongly tubercled. *Leaves* 3 on the shoots, lanceolate (not seen on the pseudobulbs). *Scape* 4—6 in., slender below, sometimes tumid above the middle ;

spike  $\frac{3}{4}$  in., dense-flid. ; bracts ovate, acuminate ; flower green and purple,  $\frac{1}{6}$  in. long ; appendages three times as long, 10-angled by as many crenate lamellæ, banded white and red ; lip purple. A very curious plant. I suppress Var. *tumida*, Par. and Rchb., the characters of which apply to the type, well figured in Bot. Mag. l. c. *Hook. f.* in Fl. Brit. Ind. v. 762.

Fl. des. Serres, t. 2476 ; *B. lemniscatum* and Var. *tumida*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 151 ; C. P. 211β.

**B. limbatum** Par. and Rchb. f. (not of Lindley), see *B. rufilabrum*.

**17. B. Lindleyanum**, Griff. Notul. iii. 287.

Scape tall, raceme many-flid. drooping and pedicelled flowers tomentose, sepals subequal ovate acuminate 5-nerved, lateral with an outer basal angle, petals small oblong crinite, lip shortly stipitate lanceolate villous, columnar arms slender.

Tenasserim ; shores of Mergui, *Griffith, Parish.*

*Pseudobulbs* 1 in. diam., depressed ovoid. *Leaf* 3—6 in., oblong-lanceolate, acute. *Scape* 4—8 in., bracts ovate, aristately acuminate, longer than the pedicel and ovary ; flowers  $\frac{1}{3}$  in. diameter, when closed as if spurred by the mentum ; pedicels  $\frac{1}{6}$  in., sepals greenish with purple stripes and margins. *Hook. f.* in Fl. Brit. Ind. v. 763.

C. P. 87.

**18. B. Lobbii**, Lindl. in Bot. Reg. 1847, sub. t. 29.

Scape O, pedicel much exceeding the petiole of the linear-oblong leaf, petals narrow 9-nerved as long as the falcately ovate-lanceolate lateral sepals lip large broadly ovate recurved.

Tenasserim ; on Donnatonong, *Parish.*

*Rhizome* stout ; pseudobulbs ovoid. *Leaves* 4—8 in. *Pedicel* 4—6 in., speckled ; sheaths loose, spotted ; flowers  $2\frac{1}{2}$ —4 in. diam. very variable in colour, ochreous or reddish yellow with red nerves, or with yellow and pink speckles and striate with brown. *Hook. f.* in Fl. Brit. Ind. v. 755.

Parish and Rchb. f. Bot. Mag. t. 4532 ; Rchb. f. in Gard. Chron. 1847, 423 ; Walp. Ann. vi. 245 ; C. P. 187.

SYN.—*B. Henshallii*, Lindl. in Gard. Chron 1852, 422.



*B. Siamense*, Rchb. f. l. c. 1867, 572.

*Sarcopodium Lobbii*, Lindl. in Paxt. Fl. Gard. i. 155; Jard. Fleur. t. 183.

*Stochilus uniflorum*, Breda. Orchid. Jav. t. 3.

Var. *Siamense*, Saund, Ref. Bot. t. 116.

*Sarcopodium Lobbii*, Var. *Henshallii*, Henfrey. in Gard. Mag. Bot. iii. 269, with woodcut.

The flowers of this species are large, the sepals and petals deep tawny yellow, the upper sepal spotted at the back with purple. It produces its solitary flowers on radical scapes from the base of the ovate one-leaved pseudobulbs during the summer months, and lasts long in beauty. *Williams*.

**19. *B. macranthum***, Lindl. in Bot. Reg. 1844, t. 13.

Scape O, pedicel longer than the petiole of elliptic oblong leaf, flower 2 in. diam., petals lanceolate 9-nerved as long as the sepals, lip small ovate acuminate strongly recurved; base truncate.

Tenasserim; alt. 3636 ft., *Parish*.

*Rhizome* stout, crinite at the nodes. *Leaf* 4—8 in. *Pedicel* 4—5 in., with appressed basal sheaths; flower ringent, rather fleshy, red-purple and spotted; anther small. *Hook. f.* in Fl. Brit. Ind. v. 753—4.

The flowers smell of cloves. *Ridley*.

Walp. Ann. vi. 245; Ridley in Ann. Bot. iv. (1890), 335, t. 22, f. 1—6; C. P. 158.

SYN.—*Sarcopodium macranthum*, Lindl. in Paxt. Fl. Gard. i. 155; Fol. Orchid. 3.

**20. *B. micranthum***, Hook. f. Ic. Plant. ined. t. 2048.

Scape slender, spike decurved or pendulous densely many-fl., bracts minute acute, flowers very small, dorsal sepal shortest triangular-ovate acute 3-nerved, lateral falcately ovate acute concave 3-nerved, petals ovate acute 1-nerved, lip large stipitate, columnar spurs slender.

Tenasserim; on Toungoo and Ta-ok. *Parish*.

*Pseudobulbs* and habit of *B. triste*, to which Par. and Rchb. f. have referred it, but the flowers are spreading, not half the size, and the sepals are acute. *Hook. f.* in Fl. Brit. Ind. v. 768.

**21. B. micropetalum**, Rchb. f. in. Walp. Ann. vi. 253.

Scape slender, sheaths small distant, raceme dense-fl'd., bracts lanceolate equalling the small flowers, sepals ovate-lanceolate acuminate, petals very broadly triangular shorter than the column, lip minute, spurs of column recurved, tips toothed.

Tenasserim ; at Moulmein, *Lobb. (in Herb. Lindl.)*.

*Rhizome* stout, pseudobulbs 1-in., ovoid. *Leaf* 4 in., rather longer than the scape and raceme, shortly petioled, linear oblong, obtuse, coriaceous, *Flowers*  $\frac{1}{6}$  in. long ; auricles of lip obscurely toothed.—The small flowers, minute petals ("tepals", Rchb. f.), and peculiar spurs of the column distinguish this. *Hook. f.* in Fl. Brit. Ind. v. 761.

**22. B. moniliforme**, Par. and Rchb. f. in Trans. Linn. Soc. xxx 151 ; C. P. 96.

The necklace Bulbophyllum. The smallest orchid known to me. Pseudobulbs  $\frac{1}{8}$  in., round depressed closely seated on a slender branched rhizome, which they completely conceal. Leaf 1 to each bulb, lance-shaped, barely  $\frac{1}{4}$  in. long, falling off before the flowers appear. Flowers solitary, at the end of a slender scape which is  $\frac{1}{2}$  in. high, themselves about  $\frac{1}{3}$  in. diam. Sepals yellowish, striped with orange. Petals much smaller, blunt. Lip red, in shape difficult to describe, as with most Bulbophylla, arched behind, bluntly pointed forwards, and fleshy like a tongue. Column surmounted by 2 awl shaped projections.

Tenasserim ; Moulmein, Island of Madremecam, Mergui, forming small irregular patches on betelnut trees. Flowering in January. *Parish.*

A remarkable little species, like a small *Eria*. *Hook. f.* in Fl. Brit. Ind. v. 757.

**23. B. nasutum**, Rchb. f. in. Gard. Chron. 1871, 1482.

Flower subsessile, sepals subequal triangular-ovate, petals very small linear, lip sessile as long as the sepals oblong, tip rather dilated rounded, base with a hooked incurved auricle on each side, anther conical.

Tenasserim ; at Moulmein, *Parish.*

*Pseudobulbs* crowded, short, obturbinate. *Leaf*  $\frac{2}{3}$  in., sessile, lanceolate, very thick. *Pedice*l with ovary  $\frac{1}{2}$  in. ; flower 1 in. diam. sepals and petals 5-nerved, pale yellow ; lip with a red-purple base,

auricles as in *B. Careyanum*.—The specimens are very insufficient. *Hook. f.* in Fl. Brit. Ind. v. 754.

C. P. 263.

**24. *B. odoratissimum***, Lindl. in Wall. Cat. 1987; Gen. and Sp. 55.

Scape stout loosely sheathed, flowers in a dense globose head, bracts longer than the ovary, sepals subequal lanceolate caudate 3-nerved, tips solid obtuse, petals minute 1-nerved, lip minute sessile papillose.

Tenasserim, *Helper*, (*Kew. distrib.* 5167, 5168).

*Rhizome* stout; pseudobulbs  $\frac{1}{2}$ — $1\frac{1}{2}$  in., subcylindric. *Leaf* 1—3 in., linear-oblong, notched. *Scape* sometimes distant from the bulb; bracts oblong or lanceolate; heads  $\frac{1}{2}$ — $\frac{3}{4}$  in diam.; pedicels  $\frac{1}{6}$  in.; flower  $\frac{1}{4}$ — $\frac{1}{3}$  in. long yellow, sweet-scented; column truncate, *Hook. f.* in. Fl. Brit. Ind. 758—9.

C. P. 50.

SYN.—*Stelis odoratissima*, Smith in Rees Cyclop. xxxiv.

*S. Caudata*, Don Prodr. 32.

*Tribrachia odoratissima*, Lindl. Collect. Bot. 41.

***B. ovalifolium*** see *B. Clandestinum*.

**25. *B. parviflorum***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 152; C. P. 305.

Scape slender, raceme elongate, bracts minute; flowers small, very shortly pedicelled, sepals subequal ciliate, dorsal lanceolate 1-nerved narrower than the ovate acute sub-3-nerved lateral, petals half as long oblong obtuse ciliate, lip shortly stipitate oblong obtuse laxly hairy, columnar spurs short.

Tenasserim; on trees in the Mts., *Parish*.

*Pseudobulbs* depressed globose; *rhizome* stout. *Leaf* 4—5 in., petioled, ligulate, obliquely 2-fid. *Scape* longer, with the raceme 6 in.; flowers  $\frac{1}{10}$  in. diam., yellow?; mentum rounded. Reichenbach describes the dorsal spur of the column as plumose. I do not find it so. *Hook. f.* in Fl. Brit. Ind. v. 763.

**26. *B. Pechei***, Bull Cat. 1891 (in Gard. Chron. 1891, vol. i. p. 676, reimpr.).

This plant belongs to a natural but puzzling group of the genus which I have characterized in the Fl. of Brit. Ind. (vol. v., 760) by the base of the lip having on each side a large incurved auricle. The type of the group, if by this term is to be understood the first published species, is *B. Careyanum* Spreng. with which *B. Pechei* agrees in the pseudobulbs, in the narrow leaves, long dense-fl. raceme, short bracts, forms of sepals and petals, and approximately in the colour of the flowers; but it differs in the unspotted sepals, in the very short acute cusps of the top of the column, and the toothed auricles of the lip. Whether such small differences, of which the only one that can be called structural is that of the column (*are sufficient to indicate a distinct species?* *B. G.*), may well be questioned. It is in its favour that the minute characters of *B. Careyanum* occurs (*sic*) in its very differently coloured var. *Ochracea*. *B. Pechei* was received at Kew from the Royal Botanical Garden of Calcutta in 1889, and flowered in January 1892. I am informed by Mr. Bull, in whose catalogue for 1891 the name first appears, that he received it from Mr. George Pechè, a resident at Moulmein. *Hook. f.* From Bot. Mag. t. 7287.

**27. *B. penicillium***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 151; C. P. 303.

Scape long stout, raceme lax-fl., bracts lanceolate, sepals narrow subequal 5-nerved long-acuminate, dorsal ovate lanceolate, lateral lanceolate from a broad gibbous base, petals small oblong obtuse fleshy crinite, lip sessile on the broad short foot of the column, lanceolate crinitely hirsute with purple hairs, columnar spurs long slender.

Tenasserim; at Moulmein, *Parish*.

*Pseudobulbs* 1 in., stout, ovoid; rhizome stout. *Leaf* 6 in., linear, notched; petiole  $1\frac{1}{2}$  in., *Scape* 12 in., lower empty bracts  $\frac{1}{3}$  in., floral shorter; pedicels  $\frac{1}{6}$  in.; flower  $\frac{1}{3}$  in. long; mentum rounded; sepals yellow striped with purple, dorsal obscurely ciliolate. *Hook. f.* in Fl. Brit. Ind. v. 764.

**28. *B. psittacoglossum***, Rchb. f. MSS.

Scape very short stout 1—3-fl., pedicel longer than the petiole of the broadly elliptic leaf, flower 1— $1\frac{1}{2}$  in. diam., petals ovate 5-nerved

as long as the falcately ovate lateral sepals, foot of column forked, lip with membranous toothed basal lobes.

Tenasserim, *Parish*.

*Pseudobulbs* ovoid, enclosed in a reticulate sheath. *Leaf* 2—4 in. long and broad. *Scape* 1—1½ in., sheath basal; pedicel 1 in., stout; sepals greenish yellow with red nerves, dorsal incurved, *Lip* spongy, yellow and scarlet, obtuse, base deeply 2-lobed; tips of column acute. *Hook. f.* Fl. Brit. Ind. v. 754.

C. P. 140.

SYN.—*Sarcopodium psittacoglossum*, Rchb. f. in Bot. Mag. t. 5408

## 29. *B. protractum*, Hook. f. Ic. Pl. 2037.

Scape capillary distant from and much shorter than the leaf, flowers very small umbelled, bracts setaceous, sepals subequal lanceolate acute 3-nerved, petals nearly as long 3-nerved, lip very small subsessile, columnar spurs slender.

Tenasserim; (on Andaman Islands), *Helper* (*Kew distrib.* 5164),

*Rhizome* long, nearly straight; pseudobulbs ¾—1 in., narrow. distant, *Leaf* 2—3 in., shortly petioled, linear-lanceolate, rather thin. *Scape* 1 in., sheath slender; pedicel ⅓ in. *Hook. f.* in Fl. Brit. Ind. v. 758.

## 30. *B. radiatum*, Lindl. in Wall. Cat. 1986; Gen. and Sp. 55.

Scape slender shorter than the linear-obtuse leaf, flowers umbellate long pedicelled, sepals subequal narrowly caudate-lanceolate 3-nerved, petals half as long narrowly lanceolate from an ovate 1—3-nerved base, finely acuminate, mentum O, lip minute stipitate, columnar spurs slender.

Tenasserim; at Tavoy, *Wallich*; Moulmein, *Parish*.

*Pseudobulbs*, 1 in. very narrowly conical or subcylindric, crowded on a stout rhizome.

*Scape* 2—3 in.; bracts setaceous, pedicel ¼—½ in., capillary; flowers yellowish; sepals ½ in. *Hook. f.* in Fl. Brit. Ind. v. 758.

Walp. Ann. vi. 264; Benth. Fl. Hongk. 353; C. P. 114.

*B. refractum* see *Cirrhopetalum refractum*.

## 31. *B. repens*, Griff. Notul. iii. 293; Ic. Pl. Asiat. t. 294.

Scape slender much shorter than the leaf, flowers in a dense globose head, bracts short, sepals 3-nerved, dorsal triangular much

shorter than the broadly oblong obtuse lateral, petals minute cuneately obovate 1-nerved, lip sessile oblong convex obtuse, columnar spurs simple or branched.

Tenasserim, *Parish*, *Gallatly* (*Jc. Herb. Calcutta*).

*Rhizome* very stout densely fibrous. *Leaves* 2—6 by  $\frac{3}{4}$ —1 in., very thick; petiole 1—3 in. *Head of flowers*  $\frac{1}{2}$  in. diam.; flowers purple,  $\frac{1}{8}$  in. long and broad, flattened dorsally.

Griffith's drawing is a very bad one, and the specimen in *Herb. Lindley* is flowerless; the scape is much longer in the Tenasserim plants. *Hook. f.* in *Fl. Brit. Ind.* v. 765.

SYN.—*B. Khasyanum*, Rchb. f. in *Trans. Linn. Soc.* xxx. 138 (not of Griff).

### 32. *B. ruflabrum*, Parish MSS.; C. P. 262.

Scape short, racemes many, and dense-fl., bracts very small, flowers very small, sepals subequal ovate-oblong obtuse, dorsal narrower, petals broadly ovate acuminate, tip serrulate, lip shortly stipitate scabrid, columnar teeth short.

Tenasserim; on trees at Mergui, *Parish*.

*Rhizome* slender; pseudobulb broadly ovoid or subglobose,  $\frac{1}{2}$ — $\frac{3}{4}$  in. long. *Leaf*  $1\frac{1}{2}$ —2 in., subsessile, elliptic or oblong. *Scape* with racemes  $2\frac{1}{2}$  in., sheath loose; bracts equalling the ovary; flowers  $\frac{1}{6}$  in. long, dull purple. Colours described from Parish's drawing named *limbatum* by Reichenbach, who describing them from a living plant in *Hort. Saunders* says that the dorsal sepal is red spotted with yellow, the lateral brown spotted yellow and with a green mesial line, the lip as dark purple. The leaves he says are lurid violet beneath. *Hook. f.* in *Fl. Brit. Ind.* v. 761.

SYN.—*B. limbatum*, Par. and Rchb. f. in *Trans. Linn. Soc.* xxx. 152. (not of Lindley).

Parish gives C. P. 336 for this, and a separate species *B. rufilabre*, Par. and Rchb. f.; C. P. 262. *B. G.*

### 33. *B. rufinum*, Rchb. f. *Xen. Orchid.* iii. 45, t. 219.

Pseudobulb 2 in. oblong, scape long stout decurved, sheaths large,

raceme 6—10 in. lax-fl'd., bracts lanceolate about as long as the flowers, flowers dirty-yellow with red streaks on the sepals, lateral sepals and small petals narrowly lanceolate acuminate, lip narrow obtuse, auricles small entire, columnar spurs slender.

Tenasserim; *Parish*.

The large pseudobulb, stout large scape, long raceme and bracts, narrow sepals, and colour of the flowers readily distinguish this from *Cupreum* and *Careyanum*. *Hook. f.* in Fl. Brit. Ind. vi. 188.

SYN.—*B. cupreum* Var. *stenopetulum* Rehb. Trans. Linn. Soc. xxx. 152; C. P. 306.

**34. *B. sicyobulbon***, Par. and Rehb. f. in Trans, Linn. Soc. xxx. 152; C. P. 193  $\beta$ .

Habit and scape of *B. Careyanum*, but pseudobulbs very large, flowers orange-yellow, bracts narrower, petals subserrulate, column and its spurs as in *B. Crassipes*. *Hook. f.* in Fl. Brit. Ind. v. 761.

Tenasserim; at Moulmein. *Parish*.

**35. *B. sillemianum***, Rehb. f. in Gard. Chron. 1884, ii. 166.

Pseudobulb subglobose, leaves cuneate ligulate, peduncle longer than the leaf 1-fl'd., flowers nearly orange, dorsal sepal ligulate obtuse acute lateral much broader oblong-triangular, petals ligulate falcate obtuse acute, lip long-clawed cordate 5-angled mauve above, whitish beneath, lip inflexed acute, column very short broad, top obtusely angled, anther with a linear apical ridge. *Hook. f.* in Fl. Brit. Ind. v. 771. (among species excluded and unknown).

Burma, (*Hort. Schlim.*).

**36. *B. simillimum***, Par. and Rehb. f. Otia Bot. Hamb. 1878, p. 49; C. P. 366.

Not given in Hooker's Fl. Brit. Ind. *B. G.*

**37. *B. spathaceum***, Rolfe.

Introduced by Messrs. Hugh Low & Co., of Clapton and sent to Kew by Mr. J. O'Brien of Harrow on the Hill, with whom it flowered,

for determination. It is allied to *B. apodum*, Hook. f. Fl. Brit. Ind. v. 766 (non Burman) but has shorter leaves, and a much denser raceme, and much more slender membranaceous bracts. The flowers are light straw-yellow, with a somewhat brighter lip. The base of the inflorescence is sheathed by spathaceous bracts, in allusion to which the name is given.

Hab. Burma ; Shan States.

*Kew Bulletin* No. 79, 1893.

**38. *B. stenobulbon***, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 153; C. P. 337.

Scape short slender, sheaths 3—5 small, flowers fascicled on the top of the scape few very small subsessile sepals subequal lanceolate finely acuminate 3-nerved three times as long as the oblong obtuse 3-nerved petals, lip sessile, columnar spurs long.

Tenasserim, *Helper* (*Kew distrib.* 5166); at Moulmein, *Parish*.

*Pseudobulb*  $\frac{1}{2}$ —1 in., cylindric; rhizome slender. *Leaf* 1—2 in. linear, notched; *Scape*  $\frac{1}{2}$ —1 in.; bracts small, lanceolate; flowers  $\frac{1}{6}$ — $\frac{1}{4}$  in. long yellow. *Hook. f.* in Fl. Brit. Ind. v. 758.

**39. *B. suavissimum***, Rolfe Gard. Chron. 1889, i. 297.

Scape very slender, raceme elongate decurved, flowers secund, sepals subequal narrowly linear-oblong obtuse 3-nerved, petals not half as long ovate or ovate-lanceolate obtuse 1-nerved obscurely crose, lip sessile small linear-oblong obtuse recurved, columnar teeth broad acute. Upper Burma, *Cooper* (*Hort. C. Bill.*)

*Pseudobulbs* 1 in., ovoid oblong, sheathed. *Leaf* 4 in., narrowly oblanceolate, obtuse, rather thin. *Scape* with raceme 8—10 in.; sheaths 2, membranous, appressed; bracts very small; flowers  $\frac{2}{3}$  in. pendulous, shortly pedicelled, very sweet scented; sepals and petals primrose; lip golden. Very like *B. auricomum*, and as deliciously scented, but perfectly glabrous. *Hook. f.* in Fl. Brit. Ind. v. 768.

***B. teniophyllum*** see *Cirrhopetalum teniophyllum*,



40. **B. triste**. Par. and Rchb. f. in Walp. Ann. vi. 253; C. P. 207

Scape slender, top decurved, spike pendulous densely many-fl'd. bracts minute acute, flowers small, dorsal sepal shortest triangular-ovate obtuse 3-nerved, lateral falcately oblong obtuse concave, petals ovate oblong acute 1-nerved, lip stipitate broad convex obtuse, columnar spurs slender.

Tenasserim; on the Toungoo Mts. *Lobb*; *Berkeley*; *Parish*.

*Rhizome* as thick as a duck's quill; pseudobulbs conico-globose,  $\frac{3}{4}$  in. diam. *Leaf* not seen. *Scape* 4—5 in.; sheaths narrow; spike 1—2 in.; rachis slender; flowers  $\frac{1}{2}$  in. long, purple?; ovary very short.

"Odour strong, pungently foetid," *Berkeley*. *Hook. f.* in Fl. Brit. Ind. v. 768.

Saund. Ref. Bot. t. 117.

**B. tripudians** see *Cirrhopetalum refractum*.

41. **B. xylophyllum**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 151; C. P. 82  $\beta$ .

Scape distant from the leaf slender erect, flowers capitate fleshy dorsally flattened, bracts very small, dorsal sepal with a minute spur at the base on each side ovate obtuse 3-nerved, lateral broadly falcately oblong, petals small oblong, lip oblong obtuse, columnar spurs falcate toothed dorsally.

Tenasserim; at Moulmein, *Parish*.

*Leaf*  $1\frac{1}{2}$ —2 by  $\frac{3}{4}$ —1 in., broadly elliptic or orbicular, very thick, smooth. *Scape* 2 in., sheaths minute, head of fl.  $\frac{1}{3}$  in. diam.; flower, suborbicular,  $\frac{1}{6}$  in. broad, greenish, lip tumid, tip rounded. *Hook f.* in Fl. Brit. Ind. v. 766.

## KEY TO SPECIES.

BULBOPHYLLUM.\* *Thouars*.

Pseudobulb from a creeping rhizome, (rarely O), 1-very rarely 2-leaved. *Scape* from the base of the pseudobulb, rarely distant from

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\* See Appendix A, Genus 9.

it. *Flowers* solitary, capitate, umbelled, spicate or racemose. *Sepals* subequal, or the dorsal rather shorter, (rarely only half as long), lateral adnate to the foot of the column. *Petals* various, usually much smaller than the dorsal sepal. *Lip* jointed on the foot of the column, mobile, usually very small and strongly recurved. *Column* very short, often 2-aristate at the top; anther 2-celled; pollinia 4 (2 rarely suppressed). A polymorphous genus of which § III. A. resembles *Sarcopodium* of *Dendrobium*, but differs in its mobile lip, and scape lateral on the pseudobulbs. See under *Cirrhopetalum* for further remarks.

## Section I. EPICRIANTHES.

No. 13; *B. Epicrianthes*.

## Section II. OXYSEPALA.

No. 7; *B. Clandestinum*.

## Section III. EUBULBOPHYLLUM.

A. *Flowers* solitary, rarely 2—3, usually large. *Scape* sometimes very short, with the pedicel of the flower long and scape-like. *Petals* and *lip* usually much larger than in other groups.

\* Column truncate, teeth at the apex in front O, or minute.

† *Lip* sessile i. e. foot of column not produced beyond the insertion of the lateral sepals.

No. 19, *B. macranthum*; No. 23, *B. nasutum*; No. 28, *B. psittacoglossum*.

†† *Lip* stipitate by the produced foot of the column.

No. 5, *B. Capillipes*; No. 18, *B. Lobbii*.

\*\* Column with 2 long teeth or spines at the top.

No. 12, *B. Dayanum*; No. 22, *B. Moniliforme*.

B. *Flowers* capitate or subumbellate. In this division the scape is often distant from the pseudobulb.

\* *Sepals* 5-or 7-nerved. *Petals* 1-or 3-nerved.

No Burman species.

\*\* *Sepals* 3-nerved. *Petals* 3-nerved, or 1-nerved in *B. radiatum*.

No. 29, *B. protractum*; No. 30, *B. radiatum*. No. 38, *B. stenobulbon*.

\* \* \* Sepals 3-nerved. Petals 1-nerved.

No. 23, *B. odoratissimum*.

C. Flowers racemose or spicate (capitate in *B. repens* and *xylophyllum*).

\* Lip with recurved lateral basal auricles. Except *micropetalum* all want revision.

No. 6, *B. Careyannum*; No. 9, *B. crassipes*; No. 10, *B. Cupreum*; No. 21, *B. micropetalum*; No. 32, *B. Rufilabrum*; No. 34, *B. Sicyobulbon*.

\* \* Lip without basal auricles.

† Sepals pubescent.

No. 8, *B. Comosum*; No. 14, *B. gracile*; No. 15, *B. hirtum*; No. 16, *B. lemniscatum*; No. 17, *B. Lindleynum*; No. 25, *B. parviflorum*.

† † Sepals glabrous or faintly ciliate. Petals ciliate or serrulate.

No. 3, *B. auricomum*; No. 27, *B. penicillium*.

† † † Sepals and petals glabrous, eciliate.

§ *Pseudobulbs* 0, or very small.

No. 1, *B. alicorne*; No. 11, *B. Cyldrinceum*, Var. *Khasiana*; No. 31, *B. repens*; No. 41, *B. xylophyllum*; No. 37, *B. spathaceum*.

§ § *Pseudobulbs* ovoid or globose.

No. 20, *B. Micranthum*; No. 39, *B. Suarissimum*; No. 40, *B. triste*.

#### Sect. IV. IONE.

No Burman species.

#### **HENOSIS,\*** *Hook. f.*

Habit of *Bulbophyllum* but flowers very long pedicelled. Sepals adnate to the prolonged foot of the column, falcately oblong, acute. Petals forming a minute broad low wing on each side of the enormous 2-winged column, along the naked foot of which they extend as a membranous border to the insertion of the lateral sepals, they are per-

\* See Appendix A. Genus 9/1.

fectly hyaline, and were so appressed to the sides of the very base of the column that (though they are indicated in a rude sketch by Lindley), I overlooked them, and I am indebted to my artist, Miss Smith, for pointing them out to me ; they are not triangular-ligulate, as described by Reichenbach, but low and very broad. Lip articulate with the foot of the column, linear, villously fringed. Anther marginal in the sinus between the wings, shortly stipitate, sub-hemispheric, 2-celled ; pollinia 2, oblong, laterally flattened ; clinandrium small transverse. *Hook. f.*

**1. *Henosis longipes*, Hook. f. Ic. Pl. t. 2051, ined.**

*Rhizome* as thick as a goose-quill, naked ; pseudobulbs  $\frac{3}{4}$ —1 in. long, broadly ovoid, smooth. *Leaf* 3—4 in., sessile, elliptic-lanceolate subacute, very coriaceous. *Scape* with raceme 9 in., very slender, 10—12-flid. ; sheaths 2—3 appressed ; bracts  $\frac{1}{6}$  in., oblong ; pedicel with ovary 1—1 $\frac{1}{2}$  in. filiform ; sepals  $\frac{1}{2}$  in. long, dorsal erect, subacute lateral rather longer ; foot of column  $\frac{1}{6}$  in.

Tenasserim ; at Moulmein, alt. 4-5000 ft. *Lobb in Herb. Lindl.*

It may be a question whether this plant should be restored to *Bulbophyllum*, in which Reichenbach placed it ; if it is to be retained it must be on account of the remarkable very large 2-winged column, like none other in the genus known to me ; the long pedicels too are quite peculiar. If referred to *Bulbophyllum* it should be to the racemose section with pseudobulbs and glabrous ciliate sepals and petals, though very unlike any member of that group. It might with *B. Gymnopus* and *B. Wrayi*, (non Burman species) form a group distinguished from all others by the lateral sepals being inserted at the apex of the naked foot of the column. *Hook. f.* in Fl. Brit. Ind. v. 771 and corrected in Supplement vol. vi. 189.

SYN.—*Bulbophyllum longipes*, Rchb. f. in Walp. Ann. vi. 253.

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**TRIAS,\*** *Lindley.*

Small epiphytes with the habit and foliage of *Bulbophyllum*. *Scape*

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\* See Appendix A. Genus 12.

lateral, 1-fld. sepals subequal, spreading, 7-nerved, lateral adnate to the foot of the column. Petals small, oblong or linear. Lip small, coriaceous or fleshy, jointed on to the foot of the column, inflexed, incumbent, mobile. Column short, broad, tip angled, winged or toothed; anther erect, caducous, 2-celled, produced into a long horn; pollinia subcoherent in pairs in each cell. *Hook. f.*

**T. Dayanum** see *Bulboph. Dayanum*.

**T. Nasutum** see *Bulboph. Nasutum*.

**1. T. oblonga**, Lindl. in Wall. Cat. 1977; Gen. and Sp. 60.

Leaves elliptic or oblong obtuse, sepals subacute, petals ovate, lip trulliform subacute with erect auricles, horn of anther notched at the tip.

Tenasserim; at Moulmein. *Wallich, Parish, Griffith.*

*Pseudobulbs*  $\frac{1}{2}$ — $\frac{2}{3}$  in. diam. *Leaves* 1— $1\frac{1}{2}$  in. long. *Scape* very slender  $\frac{1}{2}$ —1 in. *Flower* 1 in. diam.; lip grooved in the middle. Lindley describes the flowers as brownish-green, and the lip as purple. Parish has flowers yellow. *Hook. f.* in Fl. Brit. Ind. v. 780.

Wall. Pl. As. Rar. i. 55, t. 70.

SYN.—*Bolb. oblongum*, Rchb. f. in Walp. Ann. vi. 249; C. P. 90.  
*Dendrob. tripterum*, Wall. MSS.

**2. T. picta**, Benth. in Gen. Plant. iii. 505.

Leaves ovate or elliptic-lanceolate contracted at the tip or at both ends, sepals subacute, petals obovate deflexed, lip oblong granulate, tip rounded, horn of anther entire.

Tenasserim; at Moulmein, *Parish.*

*Pseudobulbs*  $\frac{3}{4}$  in. diam. *Leaves* 2— $2\frac{1}{2}$  in. *Flowers*  $\frac{3}{4}$  in. diam.; sepals greenish white with purple spots; lip not grooved, surface convex. *Hook. f.* in Fl. Brit. Ind. v. 781.

SYN.—*Bolbophyllum pictum* Parish and Rchb. f. in Trans. Linn Soc. xxx. 150; C. P. 264.

? *B. Moulmeinense*, Rchb. f. in Walp. Ann. vi. 249.

**CHIRRHOPETALUM**, *Lindley*.

Habit and characters of *Bulbophyllum*, but here distinguished by the more often and more regularly whorled flower, and by the short dorsal sepal, rarely half the length of the almost invariably much longer lateral. Lip very small and stipitate in all the species.

The species of *Bulbophyllum*, and *Cirrhopetalum* are in many cases so allied by cross affinities, that the two genera might well be regarded as one. My keeping them apart is due to the consideration of convenience and the fact that all my attempts to commingle the species of both have resulted in a chaotic aggregate, with most unsatisfactory sectional characters; in fact, a far less natural result than the keeping them apart. The species of this genus are far the most difficult of the two, as regards analysis from dried specimens, on account of the delicacy of the perianth and the fact that the length, form, colour, and consistence of the lateral sepals alter greatly during development. *C. Viridiflorum* (non Burman) and *C. Blepharistes* have the longer dorsal sepal of *Bulbophyllum*. *Hook. f.* in Fl. Brit. Ind. v. 772.

1. **C. belphearistes**, Rchb. f. in Trans. Linn. Soc. xxx. (*Bulbophyllum*); Flora 1892. p. 278; C. P. 99.

Lateral sepals 1 in. linear-lanceolate acuminate coherent 3-times as long as the lanceolate acuminate dorsal, petals broadly oblong or obovate fimbriate, columnar arms minute.

Tenasserim, *Parish*.

*Pseudobulbs* 1½—3 in., on a very stout rhizome, oblong. *Leaves* 2—3 in., oblong, very thick. *Scape* 6—12 in.; raceme short, erect, dense-fl. ; rachis stout bracts minute, acute, persistent; pedicels ¾ in., slender; lateral sepals 7-nerved, pale yellow-green with faint red nerves, bases rounded together forming a cordate-lanceolate blade; petals 5-nerved, yellow tipped with red. *Hook. f.* in Fl. Brit. Ind. v. 779—780.

2. **C. Bootanense**, Griff. Notul. iii. 297; Ic. Pl. Asiat. t. 299.

Flowers dorsally compressed coriaceous, lateral sepal dimidiate-oblong obtuse cohering in a subpanduriform blade 3-times as long as

the suborbicular apiculate dorsal, petals oblong obtuse 3-nerved, lip shortly stipitate, columnar teeth slender erect.

Tenasserim, *Parish*.

*Pseudobulbs*  $1\frac{1}{2}$ —2 in., narrow. *Leaf* 2—3 in., linear-oblong or lanceolate, notched. *Scape* stout, shorter than the leaves; umbels few-fl'd.; bracts large; pedicels stout; flowers rose-red sprinkled with purple.—In Griffith's drawing the flowers are umbelled, in Parish's sketch there are but 2 flowers, their pedicels springing from the base of the pseudobulb. This species resembles no other, and is closely related to *Bulboph. Cylindraceum* and *repens*, but its flowers are normally umbelled, and the dorsal sepal is shorter. *Hook. f.* in Fl. Brit. Ind. v. 775.

SYN.—*Bulbophyllum bootanense*, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 153, t. 32, f. 2B.; C. P; 293.

### 3. *C. Collettii*, Hemsley in Journ. Linn. Soc. ined.

Lateral sepals 4—5 in. linear-lanceolate with very long filiform tips, dorsal cymbiform narrowed into a long tail fringed with large lanceolate paleæ, petals very short broad ciliate abruptly narrowed into a linear tip fringed with large cuneate-obovate toothed paleæ, lip glabrous, columnar teeth short.

Eastern Burma; Shan Hills, alt. 6000 ft. *Collett*.

*Rhizome* very stout; pseudobulbs very small, young enclosed in coriaceous sheaths. *Leaf* 1— $1\frac{1}{2}$  in., sessile, ovate to elliptic-oblong, thick. *Scape* 3—6 in. very robust; umbel many-fl'd.; bracts  $\frac{1}{4}$ — $\frac{1}{3}$  in.; pedicel with ovary  $\frac{1}{2}$ — $\frac{2}{3}$  in.; dorsal sepal  $\frac{2}{3}$  in., 5-nerved, paleæ sessile or with a capillary stipes, mobile, terminal often largest; petals  $\frac{1}{3}$  in., very oblique, nerves 3, distant; paleæ about 12; lip thick, obtuse, recurved, papillose, base sagittate.—A beautiful plant. *Hook. f.* in Fl. Brit. Ind. v. 773—4.

### 4. *C. gamosepalum*, Griff. Notul. iii. 296.

Lateral sepals  $\frac{2}{3}$  in. linear-oblong or lanceolate acute flat at first coherent 5-nerved many times longer than the ovate obtuse long-ciliate dorsal, petals longer than the dorsal sepal lanceolate caudate 3-nerved long-ciliate, lip membranous 3-nerved, columnar arms rounded.

Tenasserim, *Griffith, Parish*. Andaman Islands, *Kurz*.

*Pseudobulbs* 1— $\frac{1}{2}$  in. *Leaf* 2—5 in., linear-oblong or oblanceolate obtuse, trabeculate with cross nervules when dry, subpetaloid. *Scape* 4 in., slender; umbels many-flid.; bracts setaceous; pedicels  $\frac{1}{4}$  in.; dorsal sepal and petals bright red, lateral speckled with purple at length widely divergent. *Hook. f.* in Fl. Brit. Ind. v. 774.

SYN.—*C. Andersonii*, Kurz in Report. Veg. Andaman. 51.

*Bulbophyllum Griffithianum*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 153; C. P. 138.

5. *C. lasiochilum*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 153. (*Bulbophyllum*); C. P. 307.

Lateral sepals 1 in. spreading falcately lanceolate subacute 5-nerved twice as long as the lanceolate coriaceous ciliolate dorsal, petals nearly as long as the dorsal sepal thick lanceolate scabrid ciliate obscurely 3-nerved, lip laterally strigose, columnar teeth short hooked.

Tenasserim; at Mergui, *Griffith, Parish*.

*Pseudobulbs*, 1 in. oblong. *Leaf* 1—2 in., very coriaceous, linear oblong. *Scape* as long as the pedicel and ovary; bracts lanceolate. *Dorsal sepal* and *petals* dark purple; lateral sepals at the end of the naked foot of the column, connate beyond the stipes of the lip. *Hook. f.* in Fl. Brit. Ind. v. 772—3.

6. *C. Merguense*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 154 (*Bulbophyllum*); C. P. 201.

Lateral sepals  $1\frac{1}{2}$  in. linear-lanceolate acute 5-nerved, very much longer than the ovate concave 5-nerved dorsal the tip of which is ciliate with rigid bristles, petals like the dorsal sepal 3-nerved, lip hispid, arms of column rounded.

Pegu; near Rangoon, *Berkeley*. Tenasserim, *Parish*.

*Pseudobulbs* 1 in., narrow 5-angled. *Leaf*  $1\frac{1}{2}$ —2 in., narrowly oblong. *Scape* 2—3 in., filiform, sheaths 2; bracts linear; pedicels  $\frac{1}{4}$  in., slender; flowers yellow and purple; lip purple. *Hook. f.* in Fl. Brit. Ind. v. 772.

7. *C. picturatum*, G. Loddiges in Bot. Reg. 1840, Misc. 49.



Lateral sepals 1—2½ in. linear-lanceolate acuminate convex coherent 5-nerved 3—5 times longer than the cymbiform abruptly aristate dorsal, petals caudate-acuminate erose 3-nerved, column large, arms subulate.

Tenasserim ; at Moulmein, *Parish*.

*Pseudobulbs* 2—7 in., ovoid, smooth, angled. *Leaf* 3—5 in., linear-oblong, tip rounded. *Scape* 5 in., slender ; bracts ½ in., slender ; pedicels as long ; flowers purple stained with dark red ; lip hastate with incurved uncinat basal lobes. *Hook. f.* in Fl. Brit. Ind. v. 774—5.

Lindl. in Bot. Reg. 1843, Sub. t. 49 ; Bot. Mag. t. 6802.

SYN.—*Bulboph. picturatum*, Rchb. f. in Walp. Ann. vi. 262 ; C. P. 28.

8. **C. Pumilio**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 153 (Bulbophyllum) ; C. P. 220.

Bracts minute, lateral sepals ½ in. linear-lanceolate acuminate 3-nerved three times as long as the ovate acuminate 3-nerved dorsal, petals orbicular-oblong broader than the dorsal 3-nerved, lip ovate-lanceolate spongy, columnar spurs short erect.

Tenasserim ; on trees, Zuggick, *Parish*.

*Rhizome* slender ; pseudobulbs small, conico-globose. *Leaf* 1—1½ in., linear-oblong. *Scape* 2 in., slender ; bracts ⅙ in. ; pedicels as long, capillary ; lateral sepals yellow, and dorsal and petals streaked with purple. *Hook. f.* in Fl. Brit. Ind. v. 778.

9. **C. refractum**, Zollinger in Flora 1847, 457.

Lateral sepals 1—2½ in., strap-shaped acuminate cohering to the tips, many times longer than the lanceolate awned ciliate dorsal, petals lanceolate ciliate and pubescent, columnar spurs long slender decurved.

Tenasserim ; *Parish*.

*Pseudobulbs* short conical, crowded. *Leaves* 2 on young pseudobulbs, 4—5 in., lanceolate acute. *Scape* stout 4—6 in. ; raceme few- or many-fl., nodding ; bracts large, ovate or lanceolate, pedicels very short ; dorsal sepal 3-nerved, orange ; lateral 3—5-nerved, golden-

yellow; petals 3-nerved and lip speckled with red; lip subcylindric, hispid or glabrate. *Hook. f.* in Fl. Brit. Ind. v. 779.

Walp. Ann. i. 776.

SYN.—*C. Wallichii*, Lindl. in Wall. Cat. 1980; in Bot. Reg. 1839, Misc. 71; 1843, Sub. t. 49 (not of Wall. Pl. As. Rar.)

*C. tripudians*, Par. and Rchb. f. in Gard. Chron. 1876, 817.

*Bulboph. tripudians*, Ejusd. in Trans. Linn. Soc. xxx. 154; C. P. 308.

*B. refractum*, Rchb. f. in Walp. Ann. vi. 259.

10. *C. retusiusculum* Rchb. f. in Gard. Chron. 1869, 1182.

Lateral sepals 1 in. linear subacute coherent 3-nerved many times longer than the broadly oblong retuse 3-nerved dorsal, petals broadly oblong as long as the dorsal 3-nerved, tip rounded, lip lanceolate recurved, columnar spurs short erect.

Tenasserim; on Moolee, alt. 5—6000 ft., *Parish, Benson*.

*Pseudobulbs*  $\frac{1}{2}$ —1 in., obpyriform, striate. *Leaf* 2—3 in., subspathulate, obtuse. *Scape* 3—4 in., slender sheaths 2; umbels many-fl.; bracts  $\frac{1}{4}$  in. slender; pedicel with ovary  $\frac{1}{2}$  in., slender. The specimens are poor, and colours unknown. *Hook. f.* in F. Brit. Ind. v. 776.

C. P. 142.

11. *C. simillimum*, Rchb. f. Otia. Bot. Hamb. 1878, p. 49. (Bulboph.)

Lateral sepals  $\frac{3}{4}$ —1 in., linear-lanceolate acuminate 5-nerved three times as long as the ovate-lanceolate acute 5-nerved dorsal, petals nearly as large as the dorsal sepal ovate acute 3-nerved serrulate, lip scabrid, column unarmed.

Tenasserim; at Moulmein, *Parish*.

*Pseudobulbs* 1 in.; *Leaf* 4 in. linear-oblong, obtuse. *Scape* slender 4—5 in.; umbels few-fl.; bracts  $\frac{1}{6}$  in., subulate; flowers spotted with purple. My specimen is very indifferent; the absence of the awn on the dorsal sepal at once distinguishes it from *C. picturatum*, and the 3-nerved serrulate petals from *elatum*. *Hook. f.* in Fl. Brit. Ind. v. 775.

**12. *C. tœniophyllum*, Par. and Rchb. f. in Trimen Journ. Bot. 1874, 198 (Bulboph.); in Otia Bot. Hamb. 1878, p. 49; C. P. 350.**

Pseudobulb conic, top narrowed, when dry furrowed lengthwise and across, leaf cuneate ligulate obtuse acute longer than the peduncle, flowers yellow with purple dots, bracts broadly triangular 1-nerved not equalling the pedicelled ovary, dorsal sepal short triangular 1-nerved, lateral 3—4 times longer coherent, bases free acute 3-nerved, petals ligulate acute 3-nerved, lip 2-edged semi-lunate, column bisetose.

Tenasserim; *Parish*.

*Hook. f.* in Fl. Brit. Ind. v. 780 (among species unknown to him).

***C. tripudians*, see *C. refractum***

## KEY TO SPECIES.

CIRRHOPE TALUM.\* *Lindley*.

A. Flowers solitary (occasionally solitary in imperfectly developed species of other groups). No. 5, *C. lasiochilum*; No. 6, *C. Merguense*.

B. Flowers capitate. No Burman species.

C. Flowers umbelled; umbels rarely reduced to 1—2 flowers.

\* *Dorsal sepal and petals ciliate fimbriate or appendaged.*

No. 3, *C. Collettii*; No. 4, *C. gamosepalum*.

\* \* *Dorsal sepal glabrous or nearly so. Petals erose ciliate or fimbriate.*

No. 7, *C. picturatum*; No. 11, *C. simillimum*.

\* \* \* *Dorsal sepal and petals glabrous, quite entire.*

† *Lateral Sepals more than ½ in. long.* (A very vague character; see note under generic description).

No. 2, *C. Bootanense*; No. 10, *C. retusiusculum*.

† † *Lateral Sepals about ½ in. long or less.*

No. 1, *C. Blepharistes*; No. 8, *C. Pumilio*; No. 9, *C. refractum*.

\* See Appendix A. Genus II.

**DRYMODA,\* Lindley.**

Flowers in November, December. One species only known.  
*Parish.*

A very small epiphyte; pseudobulbs disciform, 1-leaved. *Scape* basal, filiform, 1-fl'd; sheaths 1—2 near its base, minute. *Sepals* spreading; dorsal small, broadly ovate; lateral at the end of the naked foot of the column, oblong-lanceolate. *Petals* minute, orbicular. Lip very small, stipitate on the foot of the column, base saccate, lobes short rounded. *Column* very short, with 2 linear-oblong decurved wings and a long naked foot; pollinia 4, globose, sessile on a large gland. *Hook. f.*

1. **D. picta**, Lindl. Sert. Orch. t. 8C.; Bot. Mag. t. 5904; Walp. Ann. vi. 567.

Burma, *Griffith.* Tenasserim; on trees, Dauna-toung, about 4—5000 ft., *Parish.*

*Pseudobulbs*  $\frac{1}{2}$  in. diam.; appressed to the bark. *Leaf*  $\frac{1}{2}$  in., sessile, ovate, acute, fugacious. *Scape* 1  $\frac{1}{2}$ —2 in.; flower  $\frac{1}{2}$  in. long, lateral sepal yellow-green with purple stripes, lip dark-red purple; column and its foot and wings green, purple spotted. *Hook. f.* in Fl. Brit. Ind. v. 781.

**DENDROBIUM. Swartz.**

The Indo-Malayan Peninsular is especially rich in this magnificent genus, partly consisting of plants with tall jointed stems, bearing lateral or pseudoterminal racemes of flowers, and partly of pseudobulbous species which have their floral racemes terminal. Some are evergreen and others deciduous, flowering on the ripened leafless stems. The chief peculiarity of the flower consists in the base of the lip being more or less contracted into a claw, lying upon or adnate to the foot of the column. The genus is scattered abundantly over India, and more sparingly in the South Pacific Islands, Australia, and Japan.

\* See Appendix A. Genus 13.

The drooping kinds should be cultivated in hanging baskets, or on blocks of wood. They must have decided periods of rest and growth, and the growths should be well ripened. They are propagated in different ways. Some of them form plants on the old stems, which should be cut off and potted. Some are propagated by cutting the old stems from the plants after flowering, and laying them on a moist surface to induce them to break at the joints,—others again by dividing the plants. *Williams.*

A very large genus, which, as at present constituted, includes plants of widely different habit and general appearance. Their point of agreement lies in their flowers. Some (sub-genus *Aporum*) have flat stems with fleshy equitant leaves and small unattractive flowers. Some have pseudobulbs approximating them in appearance to *Bulbophylla*, as *D. amplum*. Others have terete (or quill-shaped) stems and leaves. Others again (and these are the true and typical *Dendrobia*), have more or less elongated cylindrical leafy pseudobulbs or stems, the leaves being generally bifarious (in two ranks), alternate and flat, i.e., in the same plane. They differ, as in habit, so in size, some being less than an inch high, others five or six feet long. The flowers are lateral, and either solitary, in fascicles, or in racemes. The sepals and petals, in other words all the segments of the flowers except the lip, are nearly uniform in shape and colouring (except in *Aporum*), the general difference being that of the three outer segments, or sepals, the two lateral ones are somewhat larger than the other and adhere commonly to the side of the column, which is semi-terete (or half-round) and is usually prolonged into a sort of blunt spur. The lip is always sessile, and articulated with the base of the column or adnate to it, generally large, undivided or 3-lobed. It is of the same thin texture generally as the rest of the flower, whereas in "*Bulbophyllum*" the lip is thick and fleshy. Pollen-masses 4, in pairs, side by side, nearly uniform and quite free, in a 2-celled anther.

This genus includes a predominating proportion of the beauty of the Orchid tribe, at least of that part of it which is found in the Eastern Hemisphere. It stretches from India through the Eastern

Archipelago to N. Australia, and Burma may fairly lay claim to be its Head centre. *Parish.*

1. **D. (Strongyle) acerosum.** Lindl. Bot. Reg. 1841. Misc. p. 86.

Stem rather slender flexuous, leaves  $\frac{1}{2}$  in. recurved subacute fleshy, flowers solitary, bracts 1 in. membranous convolute ovate-lanceolate, petals narrow acute, mentum twice as long as the dorsal sepal stout incurved obtuse, lip narrowly cuneate, tip dilated retuse waved.

Tenasserim ; *Parish.*

Stem 6—10 in. including the leafless ends. Flowers  $\frac{1}{3}$  in. long, pale rose-coloured.

Griffith describes the flowers as racemose, but they are solitary in his specimens (in Herb. Lindley). *Hook. f.* Fl. Brit. Ind. v. 726.

Walp. Ann. vi. 281; Lindl. in Journ. Linn. Soc. iii. p. 4; C. P. 34.

SYN.—*Aporum subteres*, Griff. in Calc. Journ. Nat. Hist. v. 371.

*D. subteres*, Lindl. Journ. Linn. Soc. iii. 4. "Flowers all white or veined with red; leaves curiously grooved on each side." *Ridl. in litt.*

2. **D. acrobaticum,** Rchb. f. in Gard. Chron. 1871, 802.

Stems with stalked bulbs on the opposite sides, leaves oblong ligulate, racemes lateral few-flid. at the top, flowers yellowish, sepals ligulate obtuse, petals oblong with a biggibous callus at the base within lip rhombic obtuse angled, claw with a transverse callus, disk minutely velvety, column hatchet-shaped on each side.

Tenasserim, (*Hort Veitch*).

Reichenbach says of this "near *D. polyanthum* Lindl.," but Lindley's *polyanthum* is a very doubtful plant, and not Wallich's. Of the growth he says, "One stalked bulb comes out of the side of the first, and the third very high up on the opposite side." *Hook. f.* Fl. Brit. Ind. v. 751.

3. **D. aggregatum,** Roxb. Fl. Ind. iii. 477.

A pretty dwarf evergreen species, growing about 4 in. high, with clustered 1 leaved oblong-ovate furrowed pseudobulbs, the inflorescence consisting of a short loose raceme being produced from the axil of a

small scale on the side of the pseudobulb ; the flowers are deep golden yellow with an orange-yellow stain at the base of the pubescent lip. *Williams.*

Arracan, Martaban, Tenasserim. *Hook. f.*

Stems fusiform, leaf solitary oblong, tip notched, flowers 1—2 or many in a loose drooping lateral raceme (yellow), bracts minute, sepals small ovate obtuse spreading, petals much broader ovate, base cuneate, mentum subglobose, lip shortly clawed transversely oblong from a short subconvolute base, disk concave pubescent, margin quite entire ciliate.

*Stems*  $1\frac{3}{4}$ —2 in., angled *Leaf* 2—3 by 1 in. *Raceme* from the axil of a small scale ; flowers at first primrose, at length orange,  $1\frac{3}{4}$  in. diam. ; column yellow. *Capsule* 4 in. fusiform. *Hook. f.* Fl. Brit. Ind. v. 749-50.

Lindl. in Wall. Cat. 7411 A ; in Bot. Reg. t. 1695 ; Bot. Mag. 3643 ; Paxt. Mag. vi t. 145 ; Veitch Man. Dendrob. 15 ; C. P. 13.

SYN.—*D. Lindleyi*, Steud. Nomenc. i. 490.

Var.—*Jenkinsii*.

A beautiful dwarf evergreen variety with clustered oblong tetragonal pseudobulbs, each bearing at the top a solitary oblong coriaceous retuse leaf, the whole not exceeding 2—3 in. in height. The flowers are very large for the size of the plant, and last 10 days in beauty ; they grow on slender peduncles, solitary or geminate, from the side of the pseudobulbs, and are wholly deep yellow, the lip being very large and spreading, reniform retuse, slightly pubescent and ciliate, and measuring nearly 1 in. across. This variety is best grown on a bare block of wood suspended from the roof. *Williams.*

A plant now flowering at Kew shows both *aggregatum* and *Jenkinsii* in the same clump. *Hook. f.*

SYN.—*D. Jenkinsii*, Wall. not of T. Anders. in Bot. Reg. 1839, t. 37 ; Warner, Sel. Orchid. Pl. ii. t. 28 ; Veitch l. c. 50 ; Walp. l. c. 307

**4. *D. Albo-sanguineum***, Lindl. in Paxt. Fl. Gard. ii. 93, t. 57 (very inaccurate).

A distinct and compact growing plant, with thick erect knobby stems 1 ft. high, and thicker upwards. The leaves are broad and firm, and the very large flowers grow in pairs from the joints near the top.

The flowers have the sepals and petals creamy white, while the very large squarish flat lip is of the same colour with a crimson blotch on each side near the base. It blooms in May and June, lasting a long time in perfection. It requires plenty of water during the growing season, and enjoys an abundance of light and heat. *Williams.*

Stems elongated, terete, about 1 ft. high. Leaves 5—6 near the top. Flower-stalk from between the topmost leaves, erect, 6—7-fl. Flowers  $2\frac{1}{2}$  in. diam., creamy-white. Lip same; but with some deep blood-red streaks near the base. When out of flower, this species may be readily distinguished by the black margins of the leaf-sheaths. Abundant in some places, but local. *Parish.*

Stem 6—16 in. glabrous; internodes 1— $1\frac{1}{2}$  in. by  $\frac{1}{2}$  in. diam., lower narrower. Leaves 5—7 by 1 in. Raceme 3—4 in., stout, erect; bracts sheathing; flowers 3 in. diam., slightly scented. The figure in Paxton's Magazine (copied in Fl. des Serres vii. t. 721, and Jard. Fleur. t. 203) is, as Lindley implies, a made up one, and differs *in toto* from that in the Bot. Mag., having 2-nate lateral flowers on a very stout leafless stem. Lindley, however, cites Lobb. for the flowers being racemose as they really are. A very anomalous plant. *Hook. f.* Fl. Brit. Ind. v. 722.

Tenasserim; on the Attran River, *Lobb.* Moulmein, *Williams.*  
Bot. Mag. 5130; C. P. 15.

##### 5. *D. amœnum*, Wall. in Lindl. Gen. and Sp. 78 (excl. syn).

A very pretty species, producing long slender fascicled pendulous stems 2 ft. long, linear-lanceolate acuminate wavy leaves, and short racemes, 1—3 fl., from the nodes of the stem. The sepals and petals are pure white, tipped with magenta, the lip broadly ovate with a trumpet-shaped mouth, white, with the tip deep magenta-purple, marked with 3 deeper-coloured veins, and the concave base yellow with a velvety surface. The flowers are very fragrant. *Williams.*

Stems slender pendulous, leaves linear-lanceolate acuminate, flowers 2—3 on a short peduncle from the leafless stems white with violet tips and purple lip, bracts small, sepals oblong-lanceolate obtuse, petals



larger ovate, mentum conic stout, lip shortly clawed ovate obtuse undulate crenate ciliate, disk villous.

*Stems* 1—2 ft.; internodes 1—2½ in. smooth. *Leaves* 2—4 in. membranous. *Flowers* 1½—2½ in. diam., violet scented; bracts on the peduncle imbricating. *Lip* amethyst-purple bordered with white, base yellow. Flowers very variable in size and colour. *Hook. f.* Fl. Brit. Ind. v. 738.

Tropical Himalaya, from Garwhal eastwards to Bhootan, Silhet, Burma. *Hook. f.*

Lindl. in Bot. Reg. 1844, 49; in Journ. Linn. Soc. iii. 12; Bot. Mag. t. 6199; Knowles and Weste. Floral Cab. iii. 117; Rchb. f. in Gard. Chron. N. S. iii. 305, figs. 57, 58; Id. xvi. 625, fig. 126; Veitch Man. Dendrob. 17.

SYN.—*D. mesochlorum*, Lindl. in Bot. Reg. 1847, under t. 36; Paxt. Fl. Gard. i. 63, fig. 43.

*D. Egertoniae*, Lindl. l. c.; Paxt. l. c., fig. 44.

## 6. *D. Anceps*, Swartz in Act. Holm. 1800, 246.

Leaves lanceolate or ovate-lanceolate acute, flowers axillary very shortly pedicelled, mentum longer than the sepals, lip cuneately oblong obscurely 3-lobed, membranous, veined, margins crisped.

Tenasserim, *Parish*.

*Stem* 1—3 ft. stout, flattened, sometimes ½ in. broad, *Leaves* 1—1½ in., striate when dry. *Flower* ½ in. long, greenish or yellowish. *Hook. f.* Fl. Brit. Ind. v. 724.

Willd. Sp. Pl. iv. 136; Roxb. Fl. Ind. iii. 487. Walp. Ann. vi. 279; C. P. 35.

SYN.—*Aporum anceps*, Lindl. Gen. and Sp. 71 (excl. cit. Wall); in Journ. Linn. Soc. iii. 4; Bot. Reg. t. 1239; Bot. Mag. t. 3608; Lodd. Bot. Cab. t. 1895; Griff. in Calc. Journ. Nat. Hist. v. 368 (? 369).

*D. cuspidatum*, Wall. in Bot. Reg. 1841, Misc. 7 (not of Lindl.).

## *D. Andersonii*, Scott in Journ. Agric. Soc. Ind. iii (1872) 117.

From Burma, collected by Dr. J. Anderson in 1868, and described from a plant that flowered in the Calcutta Bot. Gardens. It resembles

according to its author, a dwarfed form of *D. formosum*, from which species the description does not enable me to distinguish it. It is stated to be highly aromatic. *Hook. f. Fl. Brit. Ind. vi. 187.*

**D. angulatum**, Wall. Cat. No. 2010, (not of Lindl. Gen. and Sp. p. 88.); C. P. 88; See *D. podagraria*.

**8. D. Aphrodite**, Rchb. f. Bot. Zeit. 1862, 246.

A charming species with slender branching stems nearly 1 ft. long swollen at the joints i.e. nodose. The leaves on the younger stems are oblong-obtuse, but these fall away before the flowers are developed. The latter are produced singly from the joints,  $2\frac{1}{2}$ —3 in. across, the smooth oblong-obtuse white sepals and petals spreading, the lip clawed, with a white callous disk on the claw, the sides inflexed, with a deep blood-red spot at the base, and the front lobe large, subrhomboid-acute, deep orange with a white margin and apex. *Williams.*

Stems branched, internodes long clavate, leaves linear-oblong subacute, flowers solitary on the leafless stems stoutly pedicelled pale primrose or white, lip orange and purple, sepals linear-oblong obtuse, petals ovate-oblong, mentum obscure, lip shortly clawed orbicular-ovate from a short convolute base pubescent entire, anther purple.

*Stem* 1—2 ft.; internodes  $1\frac{1}{2}$  in. *Leaves* few, 2—3 in. *Flowers* 2 in. diam.; pedicel 1— $1\frac{1}{2}$  in.; bracts small, appressed, sometimes many and imbricate; lip bright orange with a broad pale border, and purple blotches on the tube. *Hook. f. Fl. Brit. Ind. v. 743.*

Tenasserim; at Moulmein. *Parish.*

Veitch Man. Dendrob. 17.

SYN.—*D. nodatum*, Lindl. in Gard. Chron. 1862, 177; Bot. Mag. t. 5470; Flor. des Serres, t. 1582; C. P. 106.

**9. D. arachnites**, Rchb. f. in Gard. Chron. 1874, 354.

A very distinct and brilliant novelty, with slender short shining honey-cold. stems, thickened at the articulated apex, and bearing large bright cinabar red flowers with broad linear blunt sepals and petals, and a broader convolute lip which is ligulate with basilar angles, or some-

times much attenuated in front ; the veins of the lip are of a peculiar hue. *Williams.*

Stems very short tufted terete, leaves linear-lanceolate acute, flowers 1—3 ochreous, sepals very narrow 5-nerved dorsal oblancheolate obtuse, lateral linear-lanceolate from a broad base subacute, petals narrower than the dorsal sepal 3-nerved, mentum very short conical, lip nearly as long as the sepals subpanduriformly lanceolate acuminate shortly clawed slightly recurved, disk 2-ridged at the very base.

*Stems* 2—3 in.; internodes shining, slightly swollen upwards. *Leaves* 1—3 in.; sepals spotted; petals paler, lip purple-veined. One of the narrowest-sepalled species. I have seen only a flower. *Hook. f.* Fl. Brit. Ind. v. 734-5.

Tenasserim; at Moulmein, *Boxall.*

Veitch Man. Dendrob. 19.

**10. *D. atropurpureum*, Miquel. Fl. Ind. Bot; iii. p. 644.**

Leaves lanceolate, or linear-lanceolate acute, flowers subsessile in axillary shortly peduncled bracteate heads, mentum as long as the sepals, lip thick ciliate linear, tip ciliated obscurely 3-lobed, disk caruncled. *Stem* 4—6 in. *Leaves* 1—1½ in., variable, not striate. *Flowers* about ½ in., yellowish or pink; lip with a tubercle under the tip. *Hook. f.* Fl. Brit. Ind. v. 724.

Tenasserim; at Moulmein, *Parish.*

Rchb. f. in Trans. Linn. Soc. xxx. 149; C. P. 265.

SYN.—*D. concinnum*, Miq. l. c. *Oxystophyllum atropurpureum*, Blume Rumph. iv. 41, t. 193, f. 4 and 198 C.; Walp. Ann. iii. 530. *O. carnosum*, Blume Bijdr. 336, fig. 38; Lindl. Gen. and Sp. 72. *Aporum concinnum*, Lindl. in Wall. Cat. 2019; Gen. and Sp. l. c.

I think the yellow flowered *D. carnosum* is distinct. *D. atropurpureum* is smaller, shabbier looking, and the flowers dark claret-cold. as in Blume's drawing. *Ridley in litt.*

**11. *D. bambusæfolium*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. p. 149; C. P. 188.**

Leaves linear-lanceolate unequally 2-fid, flowers 1—3 on a leaf-opposed tubercle, pedicel slender, dorsal sepal oblong-lanceolate, petals

linear-lanceolate acute, mentum as long as the ovate acute lateral sepals cylindric-conic obtuse, lip narrowly spathulate entire or oblong membranous veined, tip rounded or emarginate, sides involute.

Tenasserim, *Parish*.

*Stem* 2 ft., stouter than in *D. conostalyx* (i.e., than a crow-quill), polished. *Leaves* 5—6 by  $\frac{1}{2}$  in., sheaths minutely granulate. *Flowers*  $\frac{1}{2}$  in. long, green or white with purple on lip, which is described by *Parish* as strangely different on one and the same specimen. Habit and foliage of *D. gemellum*, of which it may be a variety. *Parish* figures a more oblong lip, notched at the end, unlike that which I examined; he informs me that the lip is very variable. *Hook. f.* Fl. Brit. Ind. v. 727.

## 12. *D. Bensoniæ*, Rchb. f. Bot. Zeit. 1867, 230.

A lovely species, having some resemblance in its habit to *D. crystallinum*. It has sub-erect or pendulous terete stems, 1—3 ft. long, the younger ones with linear acute or emarginate leaves, the older leafless ones bearing the large showy flowers 2 or 3 together from the nodes; the sepals oblong-lanceolate the petals roundish oblong, both creamy white, the orbicular concave tomentose lip orange with 2 large black-purple spots at the base. A handsome and desirable species. *Williams*.

Pegu; Rangoon, *Kurz*. Arracan on the Kareen Hills. Tenasserim; at Moulmein, *Benson*.

Rchb. f. in Bot. Mag. 5679; Jennings Orchid. t. 32; Floral Mag. t. 355; Linden. iv. t. 148; Orchidoph. 1886, 49, with fig.; Veitch Man. Dendrob. 21, with fig.; Hook. f. in Fl. Brit. Ind. v. 739; C. P. 203.

In Jennings's figure and Veitch's Manual, the flowers are on a very short peduncle; in Bot. Mag. and specimens from Rangoon, they are 2—3 racemose on peduncle  $\frac{1}{2}$ —1 in. *Hook. f.*

Var. *Xanthinum*, a very chaste variety of the above. Sepals and petals pure white; lip white with an orange disk. This variety is destitute of the 2 dark spots found at the base of the lip in the type. Moulmein. *Williams*.

**13. *D. bicameratum***, Lindl. Bot. Reg. 1840 (? 1839) Misc. p. 85.

Leaves linear-lanceolate, flowers crowded on a short sheathed peduncle, dorsal sepal ovate-oblong subacute 5-nerved, mentum urceolate, foot of column 3-lamellate, lip broadly cuneate truncate, sidelobes spreading small acute, midlobe small fleshy caruncled.

Tenasserim, *Parish*. Sikkim Himalaya, alt. 2000 ft., *Mann* (*l.c. in Hort. Bot. Calc.*). Khasia Hills, *Gibson*. Behar; on Parusnath (*l.c. in Hort. Bot. Calc.*).

*Stem* clavate, fusiform or elongate, and 12—18 in. *Leaves* 3—4 in., obliquely 2-fid. *Flowers*  $\frac{1}{3}$  in. broad, yellow with stripes of red speckles; lip golden yellow.

Apparently very variable. The fig. in Refug. Bot. has ensiform stems with internodes  $\frac{1}{2}$ — $\frac{3}{4}$  in., and a rounded midlobe of the lip. The Parusnath plant has stems 6—7 in. narrowed at both ends, internodes  $\frac{3}{4}$ —1  $\frac{1}{4}$  in., dirty-yellow flowers, and a narrower mentum; the midlobe of lip is very short. Lindley's specimen of *D. breviflorum*, erroneously supposed to be from Singapore, is a mere frustule of a stem. A note of Dr. Thomson's attached to a drawing of this species (in Hort. Cal.) states that it was introduced from Parusnath into the Calcutta Garden; it has pale rose-cold. flowers. Lindley by an oversight says of the flowers, "A little smaller than those of *Maxillaria Stapelioides*," which he figures (Bot. Reg. 1839, t. 17) with flowers  $2\frac{1}{2}$  in. diam.

*Hook. f.* Fl. Brit. Ind. v. 729.

Saund. Ref. Bot. t. 134; Walp. Ann. vi. 299; C. P. 278.

SYN.—*D. breviflorum*, Lindl. in Journ. Linn. Soc. iii. 14.

**14. *D. binoculare***, Rchb. fil. Gard. Chron. 1869, p. 785.

Stems slender, leaves lanceolate acuminate, racemes ascending, bracts very small, flowers small coppery orange with 2 maroon spots on the lip, sepals elliptic-oblong, petals obovate, lip clawed reniform pubescent plicately denticulate or crenate, disk concave. *Veitch*. Man. Dend. 23.

Pegu; hills east of Prome, *Benson*.

A little known plant, differing according to Veitch, from *D. fuscatum*. (*Gibsonii*) by its more slender stems, smaller leaves and flowers ( $\frac{1}{2}$  in diam.), and differently shaped lip. *Hook. f.* in Fl. Brit. Ind. v. 747.

Otia. Bot. Hamb. No. 23, p. 48, C. P. 344.

**D. Boxallii** Rchb. f. in Gard. Chron. 1874, t. 114. See *D. gra-tiosissimum*, Var. *Boxalli*.

**15. D. Brymerianum**, Reichb. f. in Gard. Chron. 1875, ii. 323 1876, i. 366; 1879, i. 475 fig. 65; 1881, ii. 689, fig. 140.

A handsome species with terete stems a foot or more high, slightly swollen in the middle part, with lanceolate acuminate distichous leaves and short lateral racemes produced near the top of the stem. The flowers are 3 in. across, golden yellow, with ovate lanceolate sepals linear oblong petals, and a triangular cordate lip, the middle lobe of which is greenish-yellow fringed with a long beard-like appendage of dichotomously-branched flexuose ciliated processes, and the short broad lateral lobes are deep orange with a shorter fringe. *Williams*.

Stems terete, leaves lanceolate acuminate, racemes on leafless stems 2—3-fld., flowers large yellow, sepals oblong-lanceolate, petals linear-oblong entire, mentum obscure, lip 3-lobed deeply fimbriate, base subcordate, fimbriæ of the oblong midlobe much longer than the limb.

Stems 1—2 ft., narrowed below, sulcate, old subfusiform. Leaves 4—5 in., 5—7-nerved. Raceme erect; sheaths short, lower not tubular; pedicels stout,  $1\frac{1}{2}$ —2 in (with the ovary); flowers 3 in. diam., often triandrous. The leaves are stated in Veitch's Manual to be persistent, but in the native specimens the flowers are on leafless stems. *Hook. f.* Fl. Brit. Ind. v. 745—6.

Burma, *Berkeley*.

Bot. Mag. t. 6383; Flor. Mag. N. S. t. 459; Veitch Man. Dendrob. 24, with fig.; Lindenia iv. t. 183; Gartenfl. 1883, t. 371; 1887, t. 183, 548; Orchidoph. 1881, t. 148; C. P. 369 B.

SYN.—? *D. criniferum*\*, Lindl. in Bot. Reg. 1844, Misc. 55; Walp. Ann. vi. 303.

Var. *histrionica*, Rchb. f. l. c. 1888, i. 104; Veitch l. c. 25. Has more fusiform stems, smaller flowers with much shorter fimbriæ on the lip or O. *Hook. f.*

\* Dr. Trimen has sent me a fine drawing from the Peradeniya Herbarium of a cultivated specimen of *D. Criniferum*, showing that it has no connection with *D. Brymerianum*, but belongs to the Sect. *Cadetia*. It is probably a Philippine species. *Hook. f.* Fl. Brit. Ind. vi. p. 187, Suppl.

**16. *D. calceolaria*, Carey in Hook. Exot. Fl. t. 184.**

Stout pendulous terete striated stems from 4—6 ft. long, furnished with oblong or oblong-ovate somewhat leathery striated leaves, and bearing pendent racemes of 8—10 large flowers from the sides of the old stems near the top. The flowers are large and spreading  $3\frac{1}{2}$  in. across of a creamy buff suffused with rose, the lip slipper shaped, pale yellow darker at the bases and ornamented inside on each side with a large eye-like blotch of deep blackish purple; they are agreeably musk scented. It flowers in May or June and lasts about a week in perfection. *Williams.*

Stem erect terete, leaves ovate-oblong to lanceolate, flowers 6—15 in an elongated raceme from the leafing stems large many white or pink purplish or golden-yellow, sepals elliptic-oblong, petals broader, mentum stout, lip calceolar pyriform or hemispheric with broadly incurved fimbriate margin.

*Stems* 3—5 ft.; internodes 1— $1\frac{1}{2}$  in. *Leaves* 3—5 in. coriaceous, acute or unequally notched. *Flowers*  $2\frac{1}{2}$ — $3\frac{1}{2}$  in. diam., odour musky or sweetish; perianth reticulate, extraordinarily variable in colour, especially the lip, which has fimbriate veins within, and often 2 large purple blotches. The name *D. calceolaria* (1823) is much the oldest.

The examination of a very extensive series of published and unpublished drawings of this plant convinces me that the names quoted are all referable to our plant, which is so variable that to attempt definition of its varieties would be impossible in this work. *Hook. f.* in Fl. Brit. Ind. v. 744.

Tropical Himalaya; from Kumaon, *Strachey and Winterbottom*, eastward to Assam and the Khasya Mts., and southwards to Tenasserim. Lindl. Gen. and Sp. 83; De Puydt. Les. Orch. t. 15; C. P. 136.

SYN.—*D. Cupreum*, Herbert in Bot. Reg. t. 1779.

*D. Moschatum*, Wall. in Don Prodr. 34; Pl. As. Rar. ii. 83, t. 195; Lindl. l. c. 82; in Bot. Reg. 1844, Misc. 57; in Journ. Linn. Soc. iii. 8; Bot. Mag. t. 3837; Paxt. Mag. ii. t. 241 (Excl. Syn. *D. clavatum*); Maund. Bot. i. t. 37; Hort. Parad. ii. t. 2, (? 7); Veitch Man. Dendrob. 61; Warner. Orch. alb. t. 165 Var. (cuprea); Walp. Ann. vi. 296,

**Var *Calceolus*, Williams.**

Sometimes classed with the above. Stems stout and pendulous, about 4 ft., flowers borne in racemes of 12 or more from the top of the old stems. The flowers are large but not equal in size to those of *D. Moschatum*, the sepals and petals apricot yellow, the slipper-shaped lip deeper golden; with an orange spot on each side of the base. *Williams*.

SYN.—*D. Moschatum cupreum*. *Epidendrum Moschatum* Ham. in Syme's Embassy, iii, 315 with fig. *D. Calceolus* Roxb. Fl. Ind. iii. 488; C. P. 8.

As there is a good deal of confusion in regard to this plant and its varieties and some of its nearly allied species I append in full the remarks of the Revd. Chas. Parish on the subject which may tend to make things clear. He recognizes 2 species, *Calceolaria* and *Moschatum*. Mr. Noble of the Rangoon Hort. Gardens tells me there are two kinds of *Calceolaria* one without any smell of musk which he calls *Calceolus* and another otherwise similar but musk scented, which he calls *Moschatum*; both kinds vary indefinitely. Parish under *D. Dalhousianum* (see *D. pulchellum*) says—

As there has been some confusion in respect of this and two nearly allied species, I subjoin below characters which, I hope, may suffice to distinguish them. They have all three been under my eye in a growing state at the same time.

*D. Dalhousianum*. Stems terete, 5–6 ft., pendulous, marked with red purple lines. Leaves lanceolate obtuse. Racemes lateral, but towards the end of the stem, 6–8-flowered. Sepals oblong-obtuse. Petals oblong-ovate obtuse, broader than the sepals. Lip bagged or boat shaped, villous, with the central margin turned outward. The flowers are very large, 4 in. across; cream-yellow but delicately tinged with rose; the lip is of the same general colour, with 2 deep, rich blood-red blotches on the inside. Column and anther dark purple.

*D. Calceolaria*. Stems terete, 4–5 ft. pendulous not marked with purple lines, but stippled towards the base with green and purple dots. Racemes 5–8 fld. Sepals oblong-obtuse, very widespread. Petals oblong-ovate obtuse, much broader. Lip slipper shaped, not at all pointed but with the central margin turned in very villous or soft with pile. The flowers are of the same general colour as those of *D. Dalhousianum*, though more deeply tinged with rose, and smaller, about 3 in. across. Lip yellowish, with 2 deep red-purple blotches, and crested or fimbriated veins. Column and anther dark purple.

*D. moschatum*. Stems terete, pendulous, 4–5 ft., stippled. Leaves lanceolate obtuse. Racemes 5–8-fld. Sepals lanceolate acute. Petals rhomboido-ovate



obtuse, broader. Lip slipper shaped, very obtuse, villous *outside*. Flowers orange yellow,  $2\frac{1}{2}$ —3 in. across. Lip of the same above, with 2 deep crimson blotches on the inside, and 5 crested fimbriated veins. Column and anther greenish yellow.

*D. fimbriatum* is in general character like the 3 foregoing species, but the flowers, which are golden-yellow, are much smaller, 2 in. across. The lip is not slipper shaped, and the edge all round is beautifully fringed. The stems have no special markings.

Of the 4 species here described, *D. Dalhousianum* and *D. Calceolaria* have *creamy white flowers* tinged with rose. *D. Moschatum* and *D. fimbriatum* have *yellow flowers*. *D. Dalhousianum* may always be *infallibly* distinguished by the purple lines on the first season's stems, whereas those of *D. Calceolaria* are stippled and not striped. As the stems of *D. Moschatum* however, are also stippled I know no mark whereby to distinguish this species from *D. calceolaria* when out of flower. When in flower, the colour alone (yellow) is sufficient mark. *D. fimbriatum* may at all times be distinguished from the other three both by the absence of any special marking, and by the circumstance that its stems (according to my experience) invariably *taper* at both ends, being stoutest in the middle. I may add that *D. Moschatum* and *D. Calceolaria*, smell strongly of rhubarb and magnesia, the other two do not. They are all abundant in the Tenasserim Provinces, except *D. Calceolaria*, which I never found but once. N.B. *D. Calceolaria* (our plant) of Hooker is not *D. Calceolus* of Roxburgh—which latter I believe to be *D. Moschatum*. Hence, it is probable, much of the confusion.

I have noticed that the flowers of *Moschatum* and many other yellow-fl'd. species gradually become of a much deeper yellow colour than they are at first opening. B. G.

**17. *D. capillipes***, Rchb. f. in Gard. Chron. 1867, p. 997; Xenia Orchid. ii. t. 169, figs. 4—6.

A dwarf growing species resembling a pigmy form of *D. albosanguineum*. It usually attains a height of about 6 in., producing short racemes of bright golden-yellow flowers. *Williams*.

Stem very short fusiform, leaves 1—2 lanceolate acute, flowers 1—4 on a capillary lateral peduncle golden-yellow, bracts small lanceolate, sepals small oblong-lanceolate, petals much broader, mentum short, lip with a convolute base and reniform retuse undulate limb.

*Stem* 2—6 in., 3—4-nodal. *Leaves* small, lanceolate. *Lip* with a deep orange blotch; anther elongate, conico-pyramidal. *Hook. f. Fl. Brit. Ind. v. 751*.

Burma ; on hills N. of Thayetmyo, *Parish*.

Veitch Man. Dendrob. 26 ; C. P. 186.

Var. *Elegans*, Rchb. f. in Gard. Chron. 1880, i. 743 ; stems taller, base of lip dark orange. *Hook. f.*

**18. *D. cariniferum***, Rchb. f. in Gard. Chron. 1869, 611.

Sheaths sparsely hairy, leaves linear-oblong, flowers 2—3 on a short peduncle, sepals lanceolate keeled, petals broader than the sepals elliptic-oblong apiculate, mentum as long as the dorsal sepal corniform acute incurved, side lobes of lip rounded crenate, midlobe obovate or rounded crisped papillose, disk fimbriate, ovary triquetrous.

Burma ; at Bhamo, *Berkeley*.

*Stem* 6—10 in. ; internodes  $\frac{1}{2}$ — $\frac{3}{4}$  in. *Leaves* 2—3 in., coriaceous. *Sepals*  $1\frac{1}{2}$  in., pale buff ; disk of lip with golden streaks. Flowers coriaceous when dry, fragrant. *Hook. f.* Fl. Brit. Ind. v. 720.

Veitch Man. Dendrob. 27.

Var. *lateritia*, Rchb. f. in Gard. Chron. 1883, i. 656, has brick-red on the lip. *Hook. f.*

***D. Carnosum***, see *D. atropurpureum*.

**19. *D. Chrysanthum***. Wall. Cat. 2012.

A handsome Orchid having pendulous stems 3—4 ft. long, furnished with twisted ovate-lanceolate acuminate leaves, and generally producing flowers along the stem at the time of making its growth ; they are produced at different times of the year, and grow in pairs or threes, continuing in perfection for 10 days or a fortnight. The flowers are of an intense deep yellow, fleshy, with oblong sepals and obovate petals, and a cucullate denticulate lip of the same colour marked in the centre with a large double spot of intense blood-purple. The plants grow best in suspended baskets. The *D. Paxtoni* of gardeners and of Paxton is *D. fimbriatum oculatum*. *Williams*.

Stems pendulous, leaves lanceolate acuminate, flowers 2—4-nate on an obscure leaf-opposed peduncle fleshy yellow, lip with a blood-red spot, sepals broad concave, petals orbicular fimbriate, mentum broad crested,

lip clawed orbicular from a cuneate base, villous, margins toothed or subfimbriate, everted.

*Stems* 5—7 ft., ribbed, leafy throughout; internodes short; sheaths large, cupular. *Leaves* 4—7 in., 5-nerved. *Flowers*  $1\frac{1}{2}$ —2 in. diam., waxy; back of petals subcristate, pedicel with ovary  $1\frac{1}{2}$ — $2\frac{1}{2}$  in.; bracts small, ovate, acute. *Capsule* 2 in., subclavate. In Veitch's Manual the flowers are described as 4—6 and racemose, but in the native specimens they are 2—4 and hardly racemed. *Hook. f. Fl. Brit. Ind. v, 747.*

Tropical Himalaya, from Nepal eastwards, alt. 2—5000 ft. Khasia Hills, *Griffith.*

Named in Parish's list of Burmese Orchids, but not given as Burmese by Hooker. *B. G.*

Lindl. Gen. and Sp. 80; in Journ. Linn. Soc. iii. 8; in Bot. Reg. t. 1299; Gartenfl. t. 446; Trans. Hort. Soc. Russ. 1864, t. 154; Veitch Man. Dendrob. 28.

SYN.—*D. Paxtoni*, Lindl. in Bot. Reg. 1839, Misc. 56 (not of Paxt. Mag.); Fl. des Serres vii. t. 725.

Var. *Anophthalma*, Rehb. f. in Gard. Chron. 1883, i. 44, has an unspotted lip. *Hook. f.*

Var. *Microphthalma*, Rehb. f. l. c. 1876, i. 366, has sepals without dorsal crests, petals subserrate or very shortly fimbriate. *Hook. f.*

**20. *D. Chrysotoxum***, Lindl. in Bot. Reg. 1847, under t. 19 and t. 36.

A fine yellow-flowered species. Pseudobulbs clustered, thick, clubshaped from a slender base ribbed and jointed, with 3—4 oblong leathery leaves at the end. Flower stalks just below the leaves, bearing a drooping raceme of golden-yellow flowers, with a beautifully fringed lip. Abundant in the Tenasserim Provinces. This is surely the *D. clavatum* of Roxburgh. *C. Parish.*

(*D. clavatum*, Roxb. Fl. Ind. iii. 471 is referred by Hook. f. to *D. densiflorum*. *B. G.*)

Flowers golden-yellow, the lip cucullate and roundish, fringed and ciliated, pubescent, rich orange with paler margin; there is an arch of

very deep orange at the base of the flower. It blooms in the winter and spring months, lasting 2—3 weeks in perfection. There are 2 varieties one much superior to the other. *Williams*.

Arracan and Burma, on the hills and plains. *Hook. f.*

Bot. Mag. t. 5053 ; Ill. Hort. 1858, t. 164 ; Batem. 2nd. Cent. t. 124 ; Veitch Man. Dendrob. 29 ; Benson in Gard. Chron. 1870, 796 ; Walp. Ann. vi. 305 ; Hook. f. in Fl. Brit. Ind. v. 750 ; C. P. 7.

SYN.—*D. suavisissimum* Rchb. f. in Gard. Chron. 1874, 406 ; Xen. Orchid. iii. 2, t. 202 ; Warn. Orchid. Alb. t. 13 ; Garden 1878, 166, t. 116.

Var. *suavisissimum*, Rchb. f. in Gard. Chron. 1874, 406. Stem short, stout, fusiform deeply furrowed, clustered, leaves about 3, oblong acute. The flowers which exhale a delicious perfume are produced in gracefully drooping racemes the individual blossoms being long-stalked, 3 in. across, and of a rich golden yellow having on the crispulate ringed lip a large sanguineous purple central reniform blotch, with a few crimson bars on each side behind it. It is very free blooming. Flowers during May and June and lasts 2—3 weeks in full beauty. "Upper Burma." *Williams*.

*D. suavisissimum* is regarded by Veitch as a variety of *Chrysotoxum* with shorter stouter stems and broader leaves. *Hook. f.*

**21. *D. Chrysocrepis***, Par. and Rchb. f. in Bot. Mag. t. 6007 ; in Trans. Linn. Soc. xxx. 150 ; C. P. 309.

Stems subclavate above, leaves lanceolate, flowers on the leafless stems solitary or shortly peduncled golden-yellow, sepals oblong sub-acute, petals broadly obovate, mentum short, lip pyriform calceolar villous, disk rufously villous within.

Tenasserim ; at Moulmein, *Parish*.

Stems 6—10 in. ; internodes sometimes 2 by  $\frac{1}{3}$  in. and flattened. Leaves 2—3 in., acute or unequally notched. Flowers  $1\frac{1}{2}$  in. diam. resupinate ; pedicel  $\frac{3}{4}$  in. The flowers are those of a small *D. Calceolaria*, but are solitary on leafless stems. *Hook. f.* Fl. Brit. Ind. v. 744—5  
Veitch Man. Dendrob. 29.

**22. D. Ciliatum**, Par. in Bot. Mag. 5430; C. P. 156.

Tall, leaves linear unequally notched, scapes strict long terminal and axillary, racemes laxly many and large-flowered, bracts minute, lateral sepals falcate decurved, petals spathulate, mentum short conical obtuse, lip cuneately-oblong, side lobes incurved, midlobe small ovate fimbriate with long clavate hairs on the nerves.

Tenasserim, *Parish*. Arracan, *Benson* (fid. Rchb. f.).

*Stem* 12—18 in., terete, leafy above. *Leaves* 3—4 in. by  $\frac{1}{2}$  in. Scape with the raceme 6—8 in., rather stout, pedicels  $\frac{3}{4}$  in., flowers nearly 1 in. long, pale-green; lip yellow-green; dorsal sepal and petals erect; side lobes of lip veined with red. In stout habit and large flowers this is very unlike others of section. *Hook. f.* in Fl. Brit. Ind. v. 719.

Veitch Man. Dendrob. 30.

**23. D. Cœlogyne**, Rchb. f. in Gard. Chron. 1871, 136.

Leaves broadly elliptic-oblong notched, flowers very large, sepals lanceolate acuminate, petals narrower, sidelobes of lip narrow, midlobe trapezoidly ovate.

Tenasserim; at Moulmein, *Parish*.

*Pseudobulbs* very short,  $1\frac{1}{2}$ —2 in. long. *Leaves* 3—6 in., very coriaceous, sessile or petioled. *Flowers* the largest of the section, yellowish mottled with red; bracts large, sheathing;  $2\frac{1}{2}$  in. long; lip deep dull purple. *Hook. f.* Fl. Brit. Ind. v. 712.

*Compare D. Amplum*, Lindl. Gen. and Sp. p. 74.

Wall. Cat. No. 2001; C. P. 221 and 330.

**D. crassinode** Benson and Rchb. f. in Gard. Chron. 1869, p. 164, see *D. pendulum*.

**24. D. crepidatum**, Lindl. in Paxt. Fl. Gard. i. 63, fig. 45 (not of Griffith).

A splendid deciduous drooping species, with terete striate stems 1 ft. or more in length, oblong acute leaves, and flowers in pairs from the joints of the leafless stems. The oblong sepals and broader petals are white, tipped with pink; and the roundish cordiform pubescent lip

is stained with yellow in the basal half, white edged with pink in front, the base of the lip being curiously folded in on each side. It blooms in April and May and continues for 3 weeks in perfection. It is best grown in a basket or on a block. *Williams.*

Named in Parish's list of Burmese Orchids but not given as such in Fl. Brit. Ind. *B. G.*

Hook. f. Fl. Brit. Ind. v. 740; Gleanings, No. 99, f. 95; Bot. Mag. 4993 and 5011; C. P. 66; Veitch Man. Dendrob. 33.

SYN.—*D. Lawanum*, Lindl. in Journ. Linn. Soc. iii. 10; Dalz. and Gibs. Bomb. Fl. 261.

*Dendrochilum roseum*, Dalz. in Hook. Kew. Journ. iv. (1852), 291.

**D. crepidatum**, Griff. Notul. iii. 319 (not of Lindley).

Of Griffith's description Lindley rightly says, in Journ. Linn. Soc. iii. 21, "it is so confused and self contradictory that I have not been able to identify the species." *Hook. f.*

**25. D. cretaceum**, Lindl. Bot. Reg. vol. xxxiii. 1847, t. 62.

A compact growing deciduous plant with pendent curved terete striated stems 1 ft. long or more, producing its solitary flowers from the joints of the leafless stems during June and July and lasting 6 weeks in perfection. The flowers are opaque dull white, the sepals and petals lanceolate, the lip roundish, cucullate, pubescent and fimbriate, pale yellow in the centre marked with a few crimson lines, white at the edge. The leaves borne on the growing stems are lanceolate, obliquely emarginate at the tip. *Williams.*

Stems stout curved pendulous, sheaths large loose, leaves lanceolate, flowers solitary on the leafless stems shortly stoutly pedicelled nearly white, lip crimson-veined, sepals and petals subequal linear-oblong obtuse, mentum conical obtuse, lip shortly clawed orbicular from a short convolute base pubescent ciliate.

*Stems* 6—12 in.,  $\frac{2}{3}$  in diam., internodes  $\frac{1}{2}$ —1 in. *Leaves* 3—4 in. *Flowers*  $1\frac{1}{2}$ —2 in. diam.; bracts small. *Capsule*  $\frac{1}{2}$  in., clavate. *Hook. f.* Fl. Brit. Ind. v. 736.

Assam, The Khasia Hills, and southward to Tenasserim. *Hook. f. Mergui. Williams.*

Bot. Mag. 4686; Lem. Jard. Fl. iv. t. 344; Fl. des Serres viii t. 818; Veitch Man. Dendrob. 33; C. P. 65.

**26. *D. cruentum***, Rchb. f. in Gard. Chron. 1844, i. 604.

Stems erect terete, base swollen, leaves obliquely oblong emarginate, flowers 1—2-nate axillary green, lip with crimson sidelobes, bracts lanceolate convolute, sepals triangular-ovate acuminate, keeled, petals linear acute, mentum rounded, lip 3-lobed, sidelobes erect oblong crimson, midlobe ovate apiculate green with a tumid warted scarlet crest and 3 red ridges.

Malayan Peninsular, on the west coast. (*Hort. Sanders*). Burma, *Rangoon Agri-Hortic. Society's Collectors.*

This species is not given as Burmese by Hooker. *B. G.*

*Stems* 1 ft. *Leaves* deciduous. *Flowers*  $1\frac{1}{2}$ —2 in. diam., ; margins of midlobe of lip scarlet; column green, margins crimson. *Hook. f. Fl. Brit. Ind. v. 736.*

Veitch Man. Dendrob. 33; Warn. Orchid. Alb. iv. t. 174.

**27. *D. crumenatum***, Swartz in Act. Holm. 1800, 246.

Pseudobulbs tufted, swollen at the base and there deeply grooved and sometimes constricted at intervals; swollen portion 3—4 in. long, and varying in diam. from  $\frac{1}{2}$ — $1\frac{1}{2}$  in.; suddenly tapering off into a very long slender stem, 1 ft. or more, marked with scars of the fallen leaves. Leaves fleshy, linear emarginate. Flowers single or in pairs, in a raceme at the end of the long stem; large, 2 in. across, pure white with a yellow quadrate spot on the lip; sweet scented. Flowers last only one day. This plant is rather frequent about Tavoy, with its very near ally (a smaller plant of the same character) *D. angulatum. Parish.*

Stem tall branched, base fusiform, leaves oblong obtuse or notched, flowers many on the leafless ends of the branches large white, dorsal sepal ovate-lanceolate 7-nerved, petals linear-oblong 5-nerved, mentum equalling the lanceolate acuminate lateral sepals conical acute

incurved, sidelobes of lip narrow, midlobe much larger suborbicular crisped, disk with crenate ridges. *Stems* 2—3 ft., stout. *Leaves* 2— in., coriaceous. *Flowers* 1—1  $\frac{1}{4}$  in. long; sheathed peduncle  $\frac{1}{4}$ — $\frac{1}{3}$  in.; pedicel  $\frac{1}{2}$  in.; lip with a primrose disk and sometimes pink veins. In a drawing in Hort. Calcutt. of a plant very like this from Penang named *D. flexuosum*, Wall., the sepals and petals are obtuse, and the midlobe of the lip quite entire, rounded at the tip; the mentum is shorter and straight. The Ceylon locality attributed to *D. crumenatum* is no doubt an error. *Hook. f. Fl. Brit. Ind. v. 729.*

Tenasserim, The Andaman Islands and Malay Peninsular, common *Hook. f.*

There appears to be some discrepancy between these two descriptions. Compare *D. podagraria*. *B. G.*

Sw. Roxb. Fl. Ind. iii. p. 480; Lindl. Gen. and Sp. p. 88; in Bot. Reg. 1839, t. 22; in Trans. Hort. Soc. vii. 70; Grff. Notul. iii. 315; Bot. Mag. t. 4013; Miquel Choix, t. 22; Walp. Ann. vi. 291; C. P. 30.

SYN.—*Onychium crumenatum*, Blume Bijdr. 326. Rumph. Herb. Amb. vi. t. 47, f. 2.

**28. *D. crystallinum***, Rehb. f. in Gard. Chron. 1868, 572 (? 570); Xenia Orchid. ii. 210, t. 193, f. 1.

A distinct and beautiful species, with terete somewhat slender striate pendulous stems, which are destitute of the knobbed joints so conspicuous in some of the allied plants. The distichous linear-lanceolate acuminate leaves are produced on the young stems, and fall away before the flowers are developed. The flowers are of moderate size and freely produced, the sepals and petals white tipped with magenta, the lip orange at the base and slightly tipped with magenta. Flowers during the summer months. *Williams.*

Stems pendulous, leaves falcately lanceolate acute, flowers 1—3-nate on a very short peduncle long-pedicelled white, tips purple, lip orange, sepals oblong-lanceolate acute, petals much broader, mentum



short, lip shortly clawed suborbicular, disk puberulous, base shortly convolute, anther elongate papillose.

*Stems* 12—18 in.; internodes 1 in., terete, striate. *Leaves* 4—6 in., membranous. *Flowers* 2 in. diam.; bracts ovate lanceolate; pedicels 1—1½ in.; lip with a pale margin and ochreous base. Named from the remarkable anther. *Hook. f. Fl. Brit. Ind. v. 739.*

Sikkim Himalaya, alt. 3—5000 ft., *J. D. H., Treutler*. Arracan, *Benson*. Tenasserim; at Moulmein, *Parish*.

Bot. Mag. t. 6319; Veitch Man. Dendrob. 34; C. P. 206 β

**29. *D. cumulatum***, Lindl. in Gard. Chron. 1855, p. 756.

Stem rather slender, racemes subcorymbose dorsal sepal subacute, petals much broader obovate or rounded obtuse erose, mentum more or less laterally compressed, sometimes longer than the sepals, subcylindric incurved, lip obovate-spathulate closely toothed, the claw may be traced down the spur, and is as long as the blade, and has an elongated grooved callus much raised towards the base of the claw. *Hook. f. Fl. Brit. Ind. v. p. 731, and vi. p. 185.*

Tenasserim, *Parish, Benson*.

Bot. Mag. 5703; Rchb. f. in Gard. Chron. 1868, 6; Veitch Man. Dendrob. 34; C. P. 200.

**30. *D. cuspidatum***, Lindl. in Wall. Cat. 2015; Gen. and Sp. 84; in Bot. Reg. 1844, Misc. 61 p. 1.

Stem short stout erect, leaves 2—5 linear-oblong, scape short sub-solitary erect 3—6-fl., bracts lanceolate as long as the pedicels, sepals narrowly lanceolate, petals oblanceolate, mentum short incurved, side lobes of lip large rounded, midlobe ovate acuminate quite entire, disk with a channelled ridge rising into 2 lamellæ at the base and fleshy at the tip.

Tenasserim, *Wallich, Lobb, Parish*.

*Stem* 1—2 in. *Leaves* as long, rather coriaceous. *Scape* rather stout; flowers white; sepals ½—¾ in. long; lip rather shorter, inserted above the base of the short mentum. *Hook. f. Fl. Brit. Ind. v. 716—17. C. P. 151.*

**D. cuspidatum**, Lindl. in Journ. Linn. Soc. iii. 4. See *D. Nathanielis*.

**D. Dalhousianum** see *D. pulchellum*.

**31. D. densiflorum**, Wall. Cat. 2090.

A magnificent compact-growing free-flowering evergreen Orchid. The stems are clavate, pendulous, leafy at the apex, a foot or more high, the leaves oblong acute nervose, and the racemes lateral, pendent from the upper joints of the stem, many-fl'd. ; it blooms in March, April or May and lasts from 4—6 days in perfection if kept cool. The ovate spreading sepals and petals are rich bright yellow, and the broad rhomboid serrulate retuse lip of a deep orange colour. *Williams*.

Stems narrowly clavate pendulous terete or 4-angled, leaves subterminal acute, flowers many crowded in decurved racemes white or yellow, lip orange, bracts very large membranous, sepals obtuse, petals broader erose, mentum large subglobose, lip large funnel-shaped hippocrepiform retuse in front pubescent serrulate.

*Stems* 12—18 in. *Leaves* subterminal, 4—6 in. *Flowers* 2 in. diam.; pedicel with ovary  $\frac{1}{2}$ — $\frac{3}{4}$  in.; bracts twisted and revolute, strongly nerved. *Capsule* 3 in. Veitch observes that almost the only characters of *thyrsiflorum* are the terete more slender stems white sepals and petals; he refers to it the Var. *albolutea* of Bot. Mag. He has a Var. *Walkeriana* (Warner Sel. Orchid. iii. t. 21) with longer stems and racemes, and larger flowers; also a Var. *Schroederi* (Flor. Mag. t. 502) of true *densiflorum* with looser racemes, larger flowers, french-white petals and sepals, and pale yellow anterior margin of the lip *Hook. f.* Fl. Brit. Ind. v. 748—9.

Tropical Himalaya; from Nepal eastwards to the Khasia Hills, and southwards to Tenasserim. *Hook. f.*

Lindl. in Wall. Pl. As. Rar. i. 34, t. 40; Gen. and Sp. Orch. 90; in Bot. Reg. f. 1828; in Journ. Linn. Soc. iii. 7; Paxt. Mag. v. 221; Bot. Mag. t. 3418; Fl. des Serres, t. 1397; Orch. Alb. vi. t. 303; Veitch Man. Dendrob. 37.

SYN.—*Epidendrum Dumunsattei*, Herb. Ham.

Var. *Albo-lutea*, Bot. Mag. t. 5780; C. P. 190.

A fine showy species; the apex of the stems yellowish and producing splendid clusters of white flowers with a golden-orange lip. *Williams*.

SYN.—*D. thyrsiflorum*, Rchb. f. in Ill. Hort. xxii. t. 207; Gartenfl. t. 1021; Fl. Mag. N. S. t. 449; Veitch Man. Dendrob. 80, with fig.; Gard. Chron. 1877, i. 653, fig. 105; Lindenia i. t. 46.

Var. *Walkeriana*, Warner Sel. Orchid. iii t. 21.

A very fine variety of the foregoing; stems about 3 ft. high, and racemes of flowers 2 ft. long bearing more than 50 flowers on one raceme. The blossoms are very large and of the same colour as *albo-lutea*. Moulmein. *Williams*.

SYN.—*D. thyrsiflorum Walkerianum*.

Var. *Shræderi*, Flor. Mag. t. 502. See *Hook. f.* above.

**32. D. Devonianum**, Paxt. Mag. vii. p. 169; and in Bot. Mag. t. 4429β.

This is one of the most delicate and lovely species of the genus. The stems are pendulous, slender, elongate, terete, proliferous, with a few linear-lanceolate leaves which fall away before the flowers are developed.

The flowers are produced from the nodes for fully 3 parts of the entire length of the stems, which sometimes attain the extent of 4 ft.; they are 2 in. across; the sepals cream coloured faintly shaded with pinkish purple, the petals broader than the sepals, beautifully ciliated, yellowish with a deep magenta-purple tip, and the lip broadly heart-shaped, cucullate, white with a spot of rich orange on each side of the disk, the emarginate apex with a well defined blotch of purple; the entire margin is most beautifully plumoso-fimbriate. It blooms in May and June and lasts 2 weeks in perfection. *Williams*.

Stems long pendulous, leaves linear-lanceolate acuminate, flowers 1—2 on a very short peduncle from the leafless stems white or pale yellow with purple-tipped sepals and lip, sepals lanceolate acute, petals

broadly ovate ciliate, mentum saccate, lip orbicular-cordate from a short convolute base densely deeply fimbriate.

*Stems* 2—3 ft., terete. *Leaves* 3—4 by  $\frac{1}{3}$  in. Flowers 3 in. diam. *Hook. f.* Fl. Brit. Ind. v. 743.

Bhotan Himalaya, *Griffith.* Assam, The Khasia and Naga Hills, and southwards to Tenasserim, *Hook. f.* Upper Burma, *Williams.*

Lindl. in Bot. Reg. 1844, Misc. 48; Jard Fl. t. 11; Fl. des. Serres, t. 647; Belg. Hort. iii. t. 31. (? 204); Warn. Sel. Orchid. Pl. ii. t. 11; Veitch Man. Dendrob. 38, with fig; Ill. Hort. 1857, t. 145; C. P. 310.

SYN.—*D. pictum*, Griff. fid. Lindl. in Journ. Linn. Soc. iii. 12. *D. pulchellum*, Lindl. l. c. (not of Lodd. Roxb. or Bot. Mag.).

Var. *rhodoneura* R. f. l. c. 1868, 682.

Has shorter sepals, a rounded lip with violet veins, and an odour of *Patchouli*. *Hook. f.*

Var. *candidula* R. f. l. c. 1876, i. 654, wants the purple tip, *Hook. f.*

**33. *D. dixanthum***, Rehb. f. in Gard. Chron. 1865, p. 647; 1883, i. 814.

A very pretty species with somewhat terete stems, slender at their base and attaining a foot and a half in length. It is a free grower and abundant flowerer, producing its brightly coloured flowers, which are of two shades of yellow, in the spring. The flowers are in lateral racemes of from 2—5 from the older leafless stems, the sepals lanceolate, the petals oblong, both clear pale yellow, and the broadish subquadrate minutely denticulated lip also pale yellow, with a deeper yellow blotch in the centre. *Williams.*

Stems long slender, leaves linear-lanceolate, racemes on the leafless stems often whorled 2—5-fl., flowers golden yellow, sepals oblong subacute, petals broader obtuse ciliate, mentum subglobose, lip dilated from the 2-auricled base flat puberulous ciliate.

*Stems* 2—3 ft., smooth. *Leaves* 4—6 by  $\frac{1}{3}$  in., erect caducous. *Racemes* 3—4 at each node; bracts minute; peduncle and pedicels

slender ; flowers  $1\frac{1}{2}$  in. diam. ; lip darker than the sepals, minutely barred with red at the base. *Hook. f. Fl. Brit. Ind. v. 746.*

Tenasserim ; at Moulmein, *Parish*, &c.

Bot. Mag. 5564 ; Veitch Man. Dendrob. 39 ; C. P. 21.

**34. *D. draconis***, Rehb. f. in Bot. Zeit. 1862, 214 and Xen. Orchid. ii. 130, t. 146 ; in Gard. Chron. 1883, i. 598.

A very distinct and beautiful species having waxy white flowers. It is evergreen and has moderately short fusiform stems about 1 ft. high covered with deciduous dark hairs. The leaves are coriaceous lanceolate obliquely obtuse ; and the flowers are produced in lateral or terminal racemes. The lanceolate acute sepals and petals are pure waxy white ; the lip is white with bright Roman-red or Vermillion markings on the throat. It blossoms in May or June and July, and lasts 6 weeks in perfection. *Williams*.

Stems clavate, sheaths pubescent, leaves coriaceous, flowers solitary or fascicled large, sepals lanceolate acuminate, mentum long straight, petals large undulate, lip lanceolate, side lobes small rounded, midlobe long acuminate crenate.

Near *D. longicornu* (Non Burman) but stems much stouter, clavate after leafing, leaves much broader, and midlobe of lip larger. *Hook. f. Fl. Brit. Ind. v. 722.*

Tenasserim ; at Moulmein, *Parish*.

Battem 2nd Cent. t. 166 ; Warn. Orchid All. iii. 103 ; Veitch Man. Dendrob. 39 ; C. P. 132 $\beta$ .

SYN.—*D. Eburneum*, Parish in Bot. Mag. t. 5459 ; Rev. Hort. 1883, 332, with fig. ; C. P. 131.

Parish gives *Draconis* and *Eburneum* as distinct species. *B. G.*

***D. Eburneum*** sec *D. draconis*.

**35. *D. Eulophotum***, Lindl. in Journ. Linn. Soc. iii. p. 5.

Leaves oblong or lanceolate, flowers shortly pedicelled, mentum about as long as the rest of the flower, tip broad 2-lobed, lip linear-

oblong with incurved margins and a truncate broad flat lamella on the disk, and a dilated rounded crenulate tip.

Tenasserim, *Griffith, Helfer (Kew Distrib. 5066), Parish.*

*Stem* stout 6—10 in. *Leaves* 1—2 in., obtuse, acute or acuminate, striate when dry. *Flowers* about  $\frac{1}{4}$  in. yellow and red; lamella on the lip with 2 spur-like recurved processes in the Javan specimens and in a drawing by Scortechini, truncate or retuse in the Tenasserim specimens and in another drawing by Scortechini. *Hook. f. Fl. Brit. Ind. v. 723. C. P. 32.*

**36. D. Falconeri**, Hook. Bot. Mag. tt. 4944 and 5058.

A magnificent plant of pendulous growth and one of the most beautiful of the genus. The stems are long, slender, branched and knotted, with few small linear leaves, terminal on the growing shoots. The flowers are  $4\frac{1}{2}$  in. across, produced singly all along the older leafless stems; the sepals are oblong-lanceolate, the petals ovate acuminate, the lip cucullate with the front portion ovate acute, all white, or blush-white, freely tipped with rich deep purple, the lip having in addition a broad orange-coloured disk which is marked by a large central dark purple spot; during the growing season it likes a good supply of water, but after it has finished growth it should be kept rather dry till it begins to show flowers. *Williams.*

Stems slender much branched pendulous, leaves small 1—3 in. narrow acute, flowers solitary on the subleafless stems rose-cold. or white with purple tips, lip purple and orange, sepals narrowly oblong acuminate, petals ovate lanceolate, mentum incurved, lip broadly ovate acute or acuminate from a short convolute base, mouth undulate, margins recurved pubescent ciliate. *Stems* 2—3 ft., straggling; internodes  $\frac{1}{2}$ — $\frac{3}{4}$  in., contracted in the middle, striated. *Leaves* 1—4 in. *Flowers* 2— $4\frac{1}{2}$  in. diam., colour variable; pedicel 1— $1\frac{1}{2}$  in.; bracts larger membranous. *Hook. f. in Fl. Brit. Ind. v. 742.*

Bhotan Himalaya, alt. 4000 ft.; Assam, Khasia Mts., Munnipore and Upper Burma. *Hook. f.*

*Fl. des Serres t. 1197; Lindl. in Gard. Chron. 1856, 692; Belg.*

Hortic. 1874, t. 15 ; Floral Mag. 2nd Ser. t. 226 ; Ill. Hortic. N. S. t. 243 ; Linden. i. t. 4 ; Veitch Man. Dendrob. 40 ; C. P. 359.

SYN.— *D. Wardianum* Var. *assamica*, Jennings Orchid. t. 2.

Var. *gigantia*, rather resembles *D. Wardianum*, which may prove only a form. *Hook. f.*

Williams Orchid. Alb. vi. t. 257.

Var. *albidula*. Rchb. f. in Gard. Chron. 1876, 688, 689,

Var. *robusta*. Rchb. f. in Gard. Chron. 1879, 76.

### 37. *D. Farmeri*, Paxt. Mag. xv. 241, with fig. ; Fl. Gard. iii. 104

A compact growing evergreen species. The stems are clavate from a small knob-like base and deeply furrowed so as to become quadrangular ; at the top of the stem are from 2—4 ovate leathery leaves, and later on the drooping racemes of numerous flowers ; these have the ovate obtuse sepals, and the larger petals yellowish white flushed with pink, and the lip is straw-cold. and pubescent, rich yellow in the centre and denticulate at the margin. Blooms in April and May and lasts two weeks. *Williams.*

Stems erect clavate 4—5 grooved, leaves 2—4 elliptic or oblong, flowers many in lax pendulous lateral racemes golden or pink with yellow lip, bracts small, sepals ovate-oblong, petals much broader, mentum rounded, lip shortly clawed orbicular with lateral inflexed folds pubescent, margin erose.

*Stems* 10—18 in., 4-angled, base slender. *Leaves* 4—8 in., coriaceous, striate. *Flowers* 2 in. diam., variable in colour, sepals and petals usually pink or golden yellow tinged with pink, disk ochreous. There are 2 principal varieties, *aureoflava* and *albiflora*. *Hook. f.* Fl. Brit. Ind. v. 750.

A most lovely Orchid, frequent throughout the Tenasserim Provinces. The true *Farmeri* lasts in bloom a full month. There is an inferior variety\* with weaker stems and smaller flowers which fade in 3 or 4 days. *Parish.*

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\* This is *D. palpebra* B. G.

Tropical Eastern Himalaya, and Assam to Burma. *Hook. f. Mergui. Williams.*

Lindl. in Bot. Mag. t. 4659; in Mag. of Bot. v. 15, with fig; Fl. des Serres, vii. t. 741; Lem. Jard. Fleur. t. 307; Pescatorea i. t. 4; Jennings Orchid. t. 24; Veitch Man. Dendrob. 42, with fig.; C. P. 14 a.

SYN.—*D. densiflorum* Var. *Farmeri* Regel Gartenfl. t. 788.

Var. *Albiflora*, Belg. Hortic. 1860, t. 21; Gartenfl. 1868, t. 595; Fl. des Serres 1882, t. 2461.

Var. *aureoflava*, has golden yellow flowers. It appears to be rare. I have only found it once, on Dyauna-toung having in vain sought for it after its first discovery. *Parish.*

Bot. Mag. t. 5451, Williams Orchid Alb. iii. t. 99.

**38. *D. Fimbriatum*, Hook. Exot. Fl. t. 71. (not of Dalz. in Hook. Kew Journ.).**

A very showy evergreen species with stoutish terete erect stems 2—3 ft. long, producing its drooping racemes from near the apex of the last year's stem. The leaves are distichous lanceolate acuminate, of a dark green colour. The flowers of an uniform bright yellow, the petals ciliato-denticulate, the lip, having a deeper yellow disk, is beautifully fringed with lacerate fimbriæ at the margin. Generally blossoms in spring and lasts one week. *Williams.*

Leaves lanceolate acuminate, racemes usually on leafing stems pendulous, flowers many orange-yellow, sepals and erose petals subequal, mentum short, lip orbicular equally deeply fringed, base truncate.

*Stems* 4—5 ft., base swollen. *Leaves* 6 in. *Racemes* 7—12-fl.; flowers 2—3 in. diam.; bracts small. *Hook. f. Fl. Brit. Ind. v. 745.*

*D. fimbriatum* may at all times be distinguished from *D. Dalhousianum*, *Calceolaria*, and *Moschatum* both by the absence of all special marking on the stem and by the circumstance that its stems (according to my experience) invariably taper at both ends, being stoutest in the middle. *Parish.*



Sub-tropical Himalaya, from Kumaon, alt. 5500 ft., *Strachey and Winterbottom*, eastwards, to the Khasia Hills, Munnipur, Arracan and Burma. *Hook. f. Mergui, Williams.*

Wall. Cat. 2011 (? 2001); Lindl. Gen. & Sp. 83 (not 76, which is *D. Macraei*); Paxt. Mag. Bot. ii. 172, with tab.; Jard. Fl. t. 314; Knowls and Westc. Fl. Cab. t. 109 (pale variety). Fl. Gard. iii. t. 84; Veitch Man. Dendrob. 42, with fig.; Warn. Sel. Orchid. Ser. 2, t. 19; Walp. Ann. vi. 293; Dendrob. Sp., Griff. Notul. iii 113; C. P. 88.

Var. *oculata*. Hook. Bot. Mag. t. 4160.

A beautiful variety producing its pendent flower-spikes from near the top of the stems, which grow from 3—4 ft. high. The flowers are large, of a rich orange-yellow, with a single large deep sanguineous spot towards the base of the fringed lip. It blooms in March and April and lasts 10 days if kept dry. Mergui. *Williams.*

Stems stouter deeply grooved, leaves 6—8 in. strongly nerved, lip with a deep purple blotch. *Hook. f.*

Ill. Hortic. 1, t. 15; Lem. Jard. Fl. t. 314; Warner Sel. Orchid. ii. t. 19.

SYN.—*D. Paxtoni*, Paxt. Mag. vi. 169 (not of Lindl.); Fl. des Serres vii. t. 725 (? 125).

**39 D. Findlayanum**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 149; in Gard. Chron. 1877, i. 334; C. P. 192.

A pretty and desirable species in habit something like *nodatum*. Stems from 1—2 ft. long, the knobs clubshaped and sulcate, developed above the sheathing bases of the leaves, which are linear-oblong acute, and produced on the young shoots, the flowers being borne on the older leafless ones, on 1—3-fl. peduncles, from near the top of the stems.

The sepals and petals are white suffused with pink, the broadly rounded tomentose lip deep orange-yellow on the discal portion, paling to golden yellow at the margin.

Blooms in January and February. *Williams.*

An orchid with jointed stems, joints larger upwards and tapering rather suddenly downwards, pear shaped, with a large brown sheath at

each internode. Leaves oblong-lanceolate, acute, unequally toothed at the point. Peduncles 2-fld. Sepals linear-lanceolate, acute, revolute. Petals ovate, broad. Lip nearly round and undivided, slightly crenate at the margin. Sepals and petals lilac, deepening towards the tips. Lip pale lilac at the edge, yellow in the centre, with a deep purple stain at the claw. Column striped with the same. Anther white. An elegant plant, first found by Mr. James Findlay on the route to Zimmay, and given by him to me; hence named after him. *Parish*.

Stems flexuous, internodes long clavate, leaves lanceolate, flowers 2 on a very short peduncle from the leafless stems very long pedicelled pale lilac, lip yellow, sepals oblong-lanceolate sub-acute, petals much broader, mentum sub-cylindric, lip shortly clawed orbicular from a short convolute base pubescent, tip acute.

*Stems* 1—2 ft.; internodes 1—2½ in., compressed, ¾ in. broad above the middle. *Leaves* 3—4 in., obtuse, acute or unequally notched.

Flowers 3 in. diam., widely spreading; pedicels 2—3 in.; bracts short. *Hook. f. Fl. Brit. Ind. v. 742.*

Burma; in the confines of Siam, *Findlay (Parish)*.

*Bot. Mag. t. 6438; Warner Orchid. Alb. ii. t. 92 Veitch Man. Dendrob. 43.*

#### 40. *D. formosum*, Roxb. in Wall. Cat. 1998; Fl. Ind. iii. 485.

A remarkably handsome, compact-growing evergreen species, with stoutish terete pendulous hairy stems about 1 ft. high, bearing thick ovate obliquely emarginate leaves, and racemes of 4—5 fragrant flowers at the top of the stem, the blossoms frequently 3 in. across. The sepals and much broader petals are white, the lip white with a bright yellow furrow down the centre. They last 6 weeks in perfection. *Williams*.

Stout, sheaths pubescent, leaves oblong, flowers very large in terminal or lateral racemes, sepals oblong-lanceolate acuminate, petals much larger sub-orbicular cuspidate undulate, mentum half as long as the dorsal sepal conical, lip broadly obovate entire, side lobes small rounded, midlobe dilated retuse apiculate, disk golden with 2 tubercled ridges.

*Stem* 12—18 in., as thick as the little finger. *Leaves* 3—5 by 1½

in., subamplexicaul. *Flowers* 3—5 in. diam.; bracts short, ovate. *Hook. f.* Fl. Brit. Ind. v. 721.

Tropical Himalaya; from Nepal to Bhotan; The Khasia Hills, Assam, and Southwards to Tenasserim and the Andaman Islands. *Hook. f.*

Lindl. Gen. and Sp. 81; in Wall. Pl. As. Rar. 34, t. 39; in Bot. Reg. 1838, Misc. 86, 1839, t. 64; in Journ. Linn. Soc. iii. 16; Paxt. Mag. vi. p. 49, with fig.; Williams Orchid. Alb. vii. t. 308; Veitch Man. Dendrob. 44, with fig.; Ann. des Gand. 1848, t. 171; C. P. 6.

SYN.—*D. Infundibulum*, Rchb. f. in Gartenfl. t. 1253.

Var. *gigantea*, Rchb. f. in Gard. Chron. 1882, i. 369. f. 54; Fl. des Serres, t. 1633—4.

A magnificent variety, much stronger in growth and also evergreen; the flowers which are produced at the top of the stems measure 4—5 in. across, colour snow white with a broad blotch of rich orange yellow on the centre of the lip. Moulmein. *Williams.*

Var. *Berkleyi*, Rchb. f. in Flora 1882, 534; in Gard. Chron. 1883, i. 110, 210;

Has smaller flowers (*than the type*) shorter petals, and a narrower lip. *Hook. f.*

Var. *sulphurata*, Hook. ex Rchb. f. l. c. 1882, ii. 437.

Has the throat of the lip sulphur-cold. *Hook. f.*

See also *D. Andersonii*.

#### 41. *D. fugax*, Rchb. f. in Gard. Chron. 1871, p. 1257.

Pseudobulbs 1—2 in. stipitate short fusiform 1-leaved, leaves 5 by 1 in. cuneate-ligulate obtusely acute, flowers terminal subsolitary membranous fugacious (yellow, lip white with purple and yellow marks), dorsal sepal ligulate acute, lateral subequal broader, petals much narrower, mentum rectangular, lip dilated from a cuneate base, side lobes obtuse-angled, midlobe clawed abruptly hastate flabelliform dilated emarginate retuse, sides undulate, 2 membranous keels run from the base to the top of the claw, crenulate and lobulate in front, column very short.

India (Hort. Day). *Hook. f.*

Not given as Burmese by Hooker but named in Parish's list. *B. G.*

The flowers last but a few minutes. Descript. from the author (Rchb. f.) who says it is near *convexum* Lindl. and *Xantholeucum* Rchb. f. *Hook. f. Fl. Brit. Ind. v. 752.*

C. P. No. ?

**42. *D. Fytchianum***, Batem. in Gard. Chron. 1864, 100; and 1868, 1317.

A very elegant little *Dendrobium* which first attracted my attention as ornamenting the hair of the Burmese girls in Moulmein. It was some time before I could find it. At last, when ascending the Salween river in company with the then Col. Fytche, he spied an Orchid on the overhanging branch of a tree. It proved to be the desired plant. The name records the circumstance. *Parish.*

One of the prettiest of the small flowered species, and valuable for cutting on account of its effective rosy-eyed white flowers. The stems are slender, cylindrical erect, 1 ft. long, the younger ones leafy, the leaves being oblong-lanceolate. The flowers grow in terminal racemes 8—10 together and are of dazzling whiteness, the sepals and petals roundish obovate, and the lip 3-lobed, bearded at the base, its small oblong incurved lateral lobes rose-colored, and forming a minute eye to the flower, and its obcordate apiculate middle lobe about as large as the petals, and like them pure white. *Williams.*

Erect, leaves linear-lanceolate, racemes terminal and lateral many-fl., sepals lanceolate acute, petals much larger rounded-obovate, mentum long spur-like, lip subcordately obovate, side lobes minute incurved.

*Stem* 12—18 in. *Leaves* 3—4 in. deciduous. *Flowers* 1½—2 in. across, white or rosy; pedicels sheathed; bracts small. *Hook. f. Fl. Brit. Ind. v. 719.*

Arracan, Rangoon and Tenasserim. *Parish, Berkeley.*

Veitch Man. *Dendrob.* 46; *Parish* in Bot. Mag. i. 5444; C. P. 126.

Erroneously figured as *D. barbatulum* in Bot. Mag. t. 5918, *Parish.*

Var. *rosea*, Berkeley in Gard. Chron. 1887, 209. This pretty variety was introduced in 1886 by Major-General E. S. Berkeley. It was found some 200 miles distant from the original habitat of the type,

growing on trees where rains and dews are abundant during the growing season. It has rose-cold, flowers of a very pleasing hue. Blooms during Feb. and March. *Williams.*

**43. *D. Galliceanum*, Linden. vi. t. 241.**

This plant appears to have been imported by the Horticulture Internationale with a batch of *D. thyrsiflorum*, which it closely resembles. The flowers are said to be more open, and as a consequence larger; the colour of the lip, instead of being orange as in *D. thyrsiflorum*, is of a golden-yellow colour, softening into white at the edges. It is named after M. A. Gallice, a French Orchid Amateur. Burma. *Williams.*

**44. *D. Gibsonii*, Lindl. in Paxt. Mag. v. 169; Fl. Gard. ii. 133, fig. 204.**

A very showy evergreen orchid, one of the finest of the yellow-fl. series. The stems are terete, tapering, pendulous, about 2 ft. long, with ovate-lanceolate acuminate leaves, and lateral racemes of 10—15 flowers produced near the end of the older stems. The sepals and petals are of a rich orange; the lip very broad, undulated and fringed, bright yellow, with 2 dark purple spots near the base. It blooms during the autumn months, lasts 2 weeks in good condition and requires the same treatment as *D. formosum*. *Williams.*

Stems slender, leaves lanceolate acuminate, racemes many-fl. pendulous, basal sheaths tubular, flowers orange-yellow, lip with 2 brown spots, sepals suborbicular, petals broader entire, mentum short, lip suborbicular cochleate villous obtuse, margins everted sub-fimbriate, base cuneate. Near *D. fimbriatum* but stems shorter and more slender, flowers smaller, petals not erose, lip broader, margins rather villous than fimbriate. *Hook. f. Fl. Brit. Ind. v. 746.*

Burma; common, *Hook. f.*

Veitch Man. Dendrob. 47; Walp. Ann. vi. 293.

SYN.—*D. fuscatum*, Lindl. in Journ. Linn. Soc. iii. 8; Bot. Mag. t. 6226.

**45. *D. Gratiolissimum***, Rchb. f. in. Bot. Zeit. 1865. p. 99 ; Xen. Orchid. ii. 211, t. 193.

A delicate and pretty species with sub-erect stems, slender at the base, striated and bearing ovate-lanceolate acute leaves which fall before the flower is produced. The latter are in fascicles 2 or 3 together,  $2\frac{1}{2}$  in. across ; the sepals and petals lance-shaped, white, slightly shaded and tipped with rose ; the lip entire, broadly ovate, white tipped with rose, and marked at the base with a large roundish yellow spot faintly striped with orange. *Williams*.

Stems slender pendulous striate, leaves ovate-lanceolate acute, flowers 1—2 on a short peduncle from the leafless stems long-pedicelled white with purple tips or purplish, disk of lip yellow, sepals oblong-lanceolate acute, petals broader, mentum short conical, lip orbicular or broadly ovate from a broad cuneate base entire undulate glabrous.

*Stems* 1—3 ft. ; internodes 1— $1\frac{1}{2}$  in., slightly swollen upwards ; sheaths purplish. *Leaves* 3—4 in. *Flowers*  $2\frac{1}{4}$  in. diam. ; pedicels 1 in. ; bracts small ; lip white with a large circular golden disk, sometimes purple-spotted or striated. *Hook. f.* Fl. Brit. Ind. v. 743.

Tenasserim ; at Moulmein, *Parish*

Veitch Man. Dendrob. 47.

Var. *Bulleriana*, Hook. f.

SYN.—*D. Bullerianum*, Batem. in Bot. Mag. t. 5652.

Var. *Boxallii*. Hook. f.

A very beautiful species. It has moderately stout stems, thickened on one side below the nodes, linear-ligulate bi-dentate leaves, and short clusters of flowers from the defoliated stems. The sepals and petals are white, beautifully tipped with crimson-purple, and the lip, which is white and similarly tipped, has in addition a large deep orange-coloured disk.

Moulmein. *Williams*.

SYN.—*D. Boxallii*, Rchb. f. in Gard. Chron. 1874, 315 ; Xen. Orchid. ii. 212, t. 194 ; Floral Mag. 1874, t. 114 ; Jennings Orchid. t. 19 ; Veitch l. c. 24.

In Veitch's Manual the sepals and petals of *D. Boxalli* are described as equal and similar, but I find the petals to be much the broadest. In that work *D. gratiosissimum* and *Boxalli* are kept distinct, and *D. Bullerianum* referred to the latter. They all appear to me to be like forms of one species. *Hook. f. l. c.*

**46. D. Griffithianum**, Lindl. in Bot. Reg. under t. 1756.

One of the most glorious of the yellow spring-flowering Dendrobies. It has erect clavate stems, quadrangular on the upper part, and bearing at the top a pair of lanceolate-oblong obtuse leaves. The flowers grow in loose drooping flexuose many-fl. racemes from the side of the stem; the petals are ciliolate, the lip ovate, pubescent and denticulate.

The immense drooping spikes of flowers are of the richest golden-yellow, and remain in perfection for about a fortnight. It is very rare and there are varieties often taken for it which are much inferior to the typical form. *Williams.*

Stems elongate clavate grooved, leaves oblong-lanceolate obtuse, flowers many in pendulous racemes white or yellow, lip orange, bracts small, sepals ovate-lanceolate acute spreading, petals broader ciliolate, mentum rather long incurved, lip orbicular papillose, base convolute margin denticulate.

*Stems* 12—18 in., obscurely 4-angled, base very slender. *Leaves* few,  $3\frac{1}{2}$ — $1\frac{1}{2}$  in., very coriaceous. *Flowers*  $1\frac{1}{2}$ —2 in. diam. *Hook. f. Fl. Brit. Ind. v. 749.*

Placed under *D. aggregatum* by Parish. C. P. 375. *B. G.* Burma; at Chappedong, *Wallich, Griffith.*

*Rchb. f. in Gard. Chron. 1877, i. 590, Veitch Man. Dendrob. 48.*  
*SYN.—D. aggregatum, Wall. Cat. 7411 B.*

*Var. Guibertii*, Veitch l. c.

Stems more abruptly narrowed below, leaves broadly elliptic, racemes longer, flowers larger, brighter colored. *Hook. f. l. c.*

*SYN.—D. Guibertii*, Carrière in Rev. Hort. 1876, t. 431; Ill. Hort. N. S. t. 258; De Puydt Les Orchid. t. 16.

**47. D. Harveyanum**, *Rchb. f. in Gard. Chron. 1883, 624.*

A very curious and distinct species in the way of *D. Brymerianum*—q. v.—but with smaller flowers. The stems are fusiform, furrowed, 6 in. long, and bear the lateral racemes of 4 or 5 flowers near the top. The colour of the flowers is deep chrome yellow, with a pair of orange colored blotches on the lip; the sepals are lanceolate acute, the petals oblong acute, ornamented with a dense marginal fringe, and the lip is almost circular with an obscure basal callus, a rough surface, and a distinct fringe at the margin. *Williams.*

Stems short fusiform, leaves 2—3 ovate-oblong, flowers 3 or more on a short lateral peduncle (yellow), sepals lanceolate acute, petals larger oblong fimbriate, mentum short retuse, lip orbicular concave papillose fringed. *Stems* 6—9 in., or less. *Flowers* 2 in. diam., bright canary-yellow; petals fimbriate as in *D. Brymerianum*, but less so.—I have seen no specimens. *Hook. f. Fl. Brit. Ind. v. 747.*

British Burma (*Liverpool Hortic. Association*).

Veitch Man. Dendrob. 48.

**D. hedyosmum**, Batem., see *D. scabrilingue*.

**48. D. heterocarpum**, Wall. in Lindl. Gen. & Sp. 78; Pl. As. Rar. ii. 84, t. 196.

This is a very distinct and desirable species. It has terete-clavate pendent stems, which flower after the oblong acute leaves have fallen, producing 2—3-fld racemes. The sepals and petals are cream-cold., or yellow (*D. rhombeum*), the lip with a velvety disk, golden yellow streaked and veined with crimson lines, recurved at the tip. The flowers are produced during January, February and March, and last several weeks in perfection, having a most delicious odour compared to that of violets, or of violets combined with primroses. *Williams.*

Stems sub-clavate sub-erect, leaves oblong-lanceolate, flowers 1—3 on a very short peduncle from the leafless stems white or straw-cold., lip yellow, sepals linear-oblong acute, petals ovate-lanceolate acuminate, mentum large conical truncate, lip ovate-lanceolate acute, recurved, base with incurved sides, disk pubescent.



*Stems* 9—18 in., ribbed ; internodes  $\frac{1}{2}$ — $1\frac{1}{2}$  in. *Leaves* 4—5 in., tip oblique and sub-acute or emarginate. *Flowers* 2— $2\frac{1}{2}$  in. diam., fragrant, often tinged with green ; pedicels short ; lip variable in colour, yellow, or white with a yellow disk and 2 red or purple blotches on the disk. *Hook. f.* Fl. Brit. Ind. v. 737.

Burma, *Hook. f.*

Lindl. in Bot. Reg. 1844, Misc. 49 ; Bot. Mag. t. 4708 ; Fl. des Serres viii. t. 842 ; Jard. Fleur. iv. t. 386 ; Gard. Chron. 1885, i. 472 fig. 84 B ; C. P. 137.

SYN.—*D. aureum*, Lindl. Gen. & Sp. 77 ; Wight. Ic. t. 1646 ; Veitch Man. Dendrob. 19, with fig. ; Reichenbachia ii. t. 63.

*D. rhombeum*, Lindl. in Bot. Reg. 1843, t. 17.

*Dendrob. Sp.* Griff. Notul. iii. 304 ; Ic. Pl. Asiatic. t. 306.

Var. *philippinensis*, Rchb. f. in Gard. Chron. 1880, 72.

Var. *palida*, Lindl. in Bot. Reg. 1839. t. 20.

Var. *Henshallii*, Bot. Mag. t. 4970.

#### 49. *D. Hildebrandii*, Rolfe.

A handsome species collected in the Shan States by H. H. Hildebrand Esq., in April 1893, and sent to Messrs Hugh Low & Co., of Clapton, together with living plants, which flowered in their establishment a year later. It has the general habit of a strong *D. signatum* ; Rchb. f., to which it is perhaps most nearly allied. The sepals and petals are somewhat twisted as in *D. tortile*, Lindl., though their shape and colour are quite different. The sepals and petals are very light whitish yellow, and the lip deep orange-buff with a broad light yellow margin. Mr. Hildebrand collected 3 different forms, one with sepals and petals pale green and lip sulphur-yellow, one with sepals and petals creamy pink and the lip yellow, and a third like the last, with the addition of 2 dark chocolate blotches in the throat. He observes that it grows in magnificent huge masses, and on one of the plants he counted upwards of 1,500 blooms. The old pseudobulbs show it to be as floriferous as *D. nobile*, Lindl. *Kew Bulletin* No. 90 (1894)

Hab. Shan States, alt. 1,500 ft. *H. H. Hildebrand.*

**50. *D. incurvum***, Lindl. in Journ. Linn. Soc. iii. 18.

Stems usually narrowed upwards, leaves linear-oblong obliquely notched, scapes terminal and leaf-opposed, shorter than the leaves flexuous few-flowered, bracts membranous equalling the pedicels, sepals, lanceolate, petals narrower, mentum conic acute, lip oblong-lanceolate acute or acuminate concave crisped, disk with a ridge ending in 2 teeth.

Tenasserim ; at Mergui, *Griffith, Parish.*

*Stems* 3—6 in., internodes  $\frac{1}{2}$ — $\frac{3}{4}$  in. *Leaves* 2—3 in. *Scape* with the *raceme* 1—1  $\frac{1}{2}$  in. ; bracts  $\frac{1}{8}$  in. ; pedicel with ovary twice as long ; sepals  $\frac{1}{4}$  in., white ; lip greenish with purple veins. Habit of *D. eriaeflorum* (non-Burman) *Hook f.* in Fl. Brit. Ind. v. 718.

Dendrob. No. 9, Griff. Notul. iii. 314 ; C. P. 176.

SYN.—*D. actinia* Lindl. in Journ. Linn. Soc. iii. 9.

*Actinia*, Ic. Pl. Asiat. t. 351 A. fig. 21. Griff. Notul. iii. 320.

Griffith's *Actinia* is a Pelorian form. *Hook. f.*

**51. *D. infundibulum***, Lindl. in Journ. Linn. Soc. iii. 16, (not of Rchb. f. in Gartenfl. t. 1253).

A species of the Nigro-hirsute section of great beauty, resembling *D. formosum* in habit of growth and in flowers, but with more slender stems, 1  $\frac{1}{2}$ —2 ft. high, which are terete, with lanceolate acute marginally bi-lobed leaves, and glorious flowers which are sometimes 4 in. across, and, like those of its allies, remarkable, for their very broad petals. The sepals and petals are pure white, the serrulate lip white, having in the throat of its funnel-shaped base a large blotch of golden-yellow. The flowers are produced in great profusion from the top of the stems during the summer, and last 5—6 weeks in perfection. Most useful for supplying cut flowers for decoration. *Williams.*

Sheaths pubescent above, leaves oblong or lanceolate, flowers few together large white, sepals ovate-lanceolate, petals much larger broadly obovate, mentum as long as the sepals funnel-shaped incurved, lip obo-

vate oblong toothed white, disk golden, side lobes rounded incurved, m d-lobe large shortly 2-lobed.

*Stem* 1—2 ft. *Leaves* 3—5 in., deeply 2-fid. *Flowers* 3—4 in. diam.; pedicels  $1\frac{1}{2}$  in.; bracts  $\frac{1}{2}$  in. *Hook f.*

Fl. Brit. Ind. v. 721.

Tenasserim; on Thoungyun, alt. 4—5000 ft. *Lobb, Parish.*

Although so near to *D. formosum* as to appear to be only a mountain variety, I could never succeed in making *D. infundibulum* grow in the plains. These two species, together with *Jamesianum*, *eburneum*, *xanthophlebium*, and one or two more all white flowered, form a group distinguished by Lindley as nigro-hirsute, as they are all marked by the presence of black hairs on the stems when in a young state. *Parish.*

Bot. Mag. t. 5446; Gard. Chron. 1862, 1194; Ill. Hortic. 1874, t. 172; Veitch Man. Dendrob 50; C. P. 130.

Var. *Carnioptica*, vel *ornatissima*.

A very distinct variety in which the blotch on the lip, a broad central line, and a few streaks on the sides, are of a pretty flesh colour. Burma. *Williams.*

Rchb. f. in Gard Chron. 1883, i. 656.

Var. *Jamesiana*. Veitch l. c.

Stems 1— $1\frac{1}{2}$  ft. high. Flowers nearly as large as those of *D. formosum*, pure white, except the lip which is deeply stained with crimson red. Blooms during spring and autumn. Moulmein, *Williams.*

Stouter more rigid, side lobes of lip rough within, dull red. *Hook. f. l. c.*

SYN.—*D. Jamesianum*, Rchb. f. in Gard. Chron. 1869, 554 (? 551); Williams Orch. Alb. t. 221; Gartenfl. 1867, 549, f. 137; Godef. Orchidoph. 1886, 189; with fig.; Flor. and Pomol. 1869, 187, with fig.; C. P. 132 a.

**52. *D. ionopus***, Rchb. f. in Gard. Chron. 1882, ii. 808.

Racemes short, bracts minute. flowers yellow with red blotches, sepals and petals triangular, mentum elongate falcate, claw of lip elon-

gate thick keeled with a flat retrorse tooth, limb dilated and 3-lobed, side lobes obtuse-angled, mid-lobe produced retuse emarginate, column trifid.—*Description from the author, l. c.*

Burma. (Hort. Low).

Hook. f. in Fl. Brit. Ind. v. 732.

*See also D. panduriferum* Var. *Serpens*. B. G.

**D. Jamesianum.** See *D. infundibulum* Var. *Jamesiana*.

**53. D. lamellatum**, Lindl. Gen. and Sp. 89.

Stems short pyriform flattened, leaves few ovate sub-acute, flowers 3—5 in a short drooping raceme yellow, bracts minute, sepals ovate apiculate sub-erect, petals smaller obovate, mentum long flattened, lip clawed cuneate truncate erose, disk many-grooved.

Tenasserim; at Moulmein, *Parish*.

*Stems* 3—4 by  $1\frac{1}{4}$  in., proliferously branched; internodes 3—4. *Leaves* 1— $1\frac{1}{2}$  in.; sheaths very short, broad. *Flowers*  $\frac{3}{4}$  in. long, yellow in Ic. Bot. Reg.; petals white in Ic. Herb. Kew of Bornean Plant; flower pale pink with white petals in Ic. Parish. This is by an error described as a native of Ceylon; if imported from that country, it was doubtless from the Bot. Gardens there. *Hook. f.* in Fl. Brit. Ind. v. 749.

SYN.—*D. Compressum*, Lindl. in Bot. Reg. 1842, Misc. 76; 1844 t. 53; Walp. Ann. iv. 307; Rchb. f. Otia. Bot. Hamb. 1878 p. 48; C. P. 354.

*Onychium lamellatum*, Blume Bijl. 526 (? 326) fig. 10.

**54. D. lassioglossum**, Rchb. f. in Gard. Chron. 1868, 682; 1869, 277.

A somewhat small species but deserving attention. Stems slender terete drooping 1—2 ft. long, with flat lanceolate acuminate leaves and at the nodes opposite the leaves short racemes of 2—3 flowers which are white, except a few reddish-purple streaks on the erect lateral lobes of the lip, and a tuft of pale yellow hairs on the disk. *Williams*.

Stem slender branched, flowers on the leafing stems 2—4 on very short axillary peduncles shortly pedicelled white with a purple veined lip, sepals oblong obtuse, petals broadly obovate, mentum as long as the dorsal sepal conical incurved, side lobes of sessile lip rounded entire purple veined, midlobe shorter sub-quadrate crisped, disk villous, yellow or greenish.

*Stem* 10—18 in., internodes 1—2 in. *Leaves* 3—5 in., lanceolate, acuminate, base acute. *Flowers* 1½—2 in. diam. *Hook. f. fl. Brit Ind. v. 734.*

Burma, *Parish.*

Bot. Mag. t. 5825 ; Veitch Man. Dendrob. 52.

**55. *D. leucochlorum***, Rchb. f. in. Gard. Chron. 1879, i. 202.

Pseudobulbs cylindric channelled thickish stipitate, raceme 1—2 fld., sepals triangular, petals as long oblong acute, mentum conical, lip 3-lobed in the middle, side lobes obtuse, mid-lobe produced broad retuse, disk muricate between the side lobes, column short.

Tenasserim ; at Moulmein (*Hort Veitch*).

Flowers as large as *D. Sphegidoslossum*, white, mentum green, lip white, yellow-green without, side lobes with purple lines. *Descript. from the author l.c.*

Hook. f. Fl. Brit. Ind. v. 752 (among species unknown to him).

**56. *D. lituiflorum***, Lindl. in Gard. Chron. 1856, 372 (? 185).

A charming species with slender terete fascicled pendulous yellowish deciduous stems 2—3 ft. long, with a knob-like base, and in the younger stages bearing oblong lanceolate leaves. It succeeds best in sphagnum, in a suspended basket. The flowers, produced on the older leafless stems, are large, and are borne in pairs or in 4—5 fld. fascicles from the nodes. The oblong lanceolate sepals and broader petals are dark bright purple, the lip convolute at the base, and there white with heavy purple transverse stripes, the limb orbicular concave, turned up like a trumpet, the broad disk deep violet-purple surrounded by a yellowish velvety band, which is edged with purple. Blooms in March and April. Requires great attention as regards

moisture while growing, but should be kept dry in the cold season.  
*Williams.*

Stems slender pendulous, leaves linear-lanceolate, flowers 1—5 on a short very large-bracted peduncle from the naked stems purple or white with purple and white lip, sepals linear-oblong subacute, petals broadly elliptic, mentum short saccate, lip trumpet-shaped puberulous, mouth large orbicular, margins recurved.

*Stems* 12—24 in. ; internodes 1—1½ in., very smooth. *Leaves* 3—4 in. long. *Flowers* 2—2½ in. diam., variable in colouring ; bracts ⅓—½ in., white, scarious ; tube of lip ½—¾ in., purple and white ; limb upcurved, deep purple within, with a broad, white ring within the purple margin. *Hook. f.* Fl. Brit. Ind. v. 740.

Assam, Rangoon and Burma, *Griffith, &c.*

Bot. Mag. t. 6050 ; Warner Sel. Orchid. ii. t. 3 ; Rchb. f. Xen. Orchid. iii. 36, t. 214 ; Veitch Man. Dendrob. 54.

SYN.—*D. Hanburyanum* Rchb. f. in Bonpland. iv. 329.

Var. *Farmeri*, Gartenfl. t. 1086.

Var. *Candida*, Rchb. f. in Gard. Chron. 1880, i. 586.

Has white flowers with a pale yellow lip. *Hook. f.*

Var. *Freemanii*, Rchb. f. l. c. 1887. 744.

Has short stiff stems, and purple sepals and petals. *Hook. f.*

**57. *D. Lubbersianum***, Rchb. f. Gard. Chron. 1882, i. 460.

In growth like a smaller *formosum*. *Parish.*

Stem hirsute with black hairs, leaves oblong hispidulous on both surfaces, sepals triangular acute carinulate, petals oblong apiculate, mentum conical rather shorter than the pedicelled ovary, lip cuneate dilated 3-fid., side lobes obtuse-angled toothed in front, midlobe short lobulate fimbriate retuse and with pectinate filiform processes, disk with a thickened grooved ridge between the side lobes.

Burma, (*Hort. Veitch* where it no longer exists.)

*Sepals and petals* yellowish white ; lip with 3 carnation blotches.

*Description from the author.*

*Hook. f.* Fl. Brit. Ind. v. 722.

**58. D. luteolum.** Batem. in Gard. Chron. 1864, 269.

A very distinct and desirable species in which the stems are erect and terete, and bear lanceolate leaves, simultaneously on the upper part a profusion of short lateral 2—4-fl. racemes of pale primrose coloured flowers, of which the lip has roundish lateral lobes, and the middle lobe a downy yellow disk marked by a few red lines. It flowers in January and February and lasts a long time in perfection. *Williams.*

Stem erect, leaves linear-oblong acute coriaceous, flowers 2—4 on a short axillary peduncle yellow, sepals oblong subacute, petals much broader obtuse, mentum stout obtuse, lip broadly ovate-oblong, side lobes rounded, midlobe ovate subacute undulate, disk with 3—5 villous ridges.

*Stem* 10—12 in., furrowed, striped. *Leaves* 3—4 in. sessile. *Flowers* 2½ in. across; sheaths of peduncle obtuse; pedicels ½ in.; lip with red veins between the side lobes. *Hook. f. Fl. Brit. Ind. v. 733—4.*

Tenasserim; on the Attrán River, *Parish.*

*Bot. Mag.* 5441; *Veitch Man. Dendrob.* 57, with fig.; *C.P.* 139.

*Var. chlorocentrum*, *Rchb. f. in Gard. Chron.* 1883, i. 340, fig. 48.

This variety is altogether superior to the type, the flowers being much larger and of better substance. It bears tufts of green hairs on the middle of the lip. *Williams.*

*Williams Orchid Alb.* vii. t. 322.

**59. D. Macraei**, *Lindl. Gen. and Sp.* p. 75; in *Journ. Linn. Soc.* iii. p. 6.

Leaf linear-oblong obtuse, flowers 2—3 shortly pedicelled, sepals and petals erecto-patent linear-lanceolate acute, mentum short conic, side lobes of lip oblong obtuse, midlobe small with 2 diverging lobules crenulate and crisped, disk between the side lobes with 2 fleshy crests.

Sikkim Himalaya, alt. 7—8000 ft., (*Herb. Hort. Calc.*) Khasia Mts., alt. 4000 ft., *J. D. H. and T. T.* The Concan, at Ram Ghat, *Dalzell.* Nilghiri Hills, *G. Thomson.* Ceylon, not uncommon, *Thwaites.*—  
*Distrib.* Java. Given in *Parish's* list of Burmese orchids. *B. G.*

*Rootstock* creeping, annulate ; stems pendulous, 2—3 ft. ; branches ending in fusiform pseudobulbs 2—2½ in. long. *Leaves* 4—8 in., sessile. *Flowers*, ¾—1 in. long, white ; pedicels ¾—1 in. ; bracts basal, sheathing ; side lobes of lip sprinkled with red, midlobe variable, *Hook. f.* Fl. Brit. Ind. v. 714.

Thwaites Enum. 297 ; Dalz. and Gibs. Bomb. Fl. 260 ; C. P. 85.

SYN.—*D. fimbriatum*, Lindl. Gen. and Sp. 76 (not of Hook.)

*D. nodosum*, Dalz. in. Hook. Journ. Bot. iv. (1852.) 292.

*D. Rabani*, Lindl. Journ. Linn. Soc. l. c. 7.

*D. pardalinum*, Rchb. f. in Gard. Chron. 1885. ii. 230.

*D. Flabellum*, Rchb. f. in Bonplandia 1857, 56 ; Xen. Orchid. ii. t. 118.

*Desmotrichum fimbriatum*, Blume Bijl. 329.

I find no characters whereby to distinguish the species included above under *D. Macraei*. Thwaites says of the Ceylon plant leaves usually 2-nate, but I have never seen more than one in any specimen or drawing. *Hook. f.* l, c.

#### 60. *D. Marmoratum*, Rchb. f. in Gard. Chron. 1875, 492.

Stems stout greyish-black terete, flowers 2-nate on the leafless stems (white with purple tips, lip purplish in front), mentum short retuse, lip oblong from a cuneate base ciliate densely velvety towards the base.

*Description from the author, l. c.*

Burma, *Boxall* (*Hort. Low*).

*Hook. f.* in Fl. Brit. Ind. v. 738.

*D. Melanophthalmum*, Rchb. f. in Gard. Chron. 1869, 164 ; 1870, 417. See *D. pendulum*.

#### 61. *D. Moulmeinense*, Parish MSS.

Stems slender, leaves (narrowly linear-lanceolate, *Parish*), flowers on the leafless stems lower racemose upper 1—2 on a short peduncle, pedicels slender, bracts ovate concave, sepals oblong-lanceolate acute petals elliptic acute erose, mentum subcylindric obtuse, lip large broader



than long flabellately orbicular expanded sessile, base cuneate pubescent above glabrous beneath fimbriate all round.

Tenasserim ; at Moulmein, *Parish*.

*Stems* about as thick as a duck's quill ; internodes 1 in. *Flowers* 1  $\frac{1}{4}$ —2 in. diam. membranous ; rachis of 2—4 fld. raceme  $\frac{3}{4}$  in., slender base with a lunate sheath ; bracts  $\frac{1}{6}$  in., thin ; sepals and petals pale yellow?, lip primrose-yellow with spotted bars at the very shortly convolute base ; column very short. *D. Moulmeinense*, is perhaps only a state of *D. dioxanthum*. *Hook. f.* in Fl. Brit. Ind. v. 746 ; *l.c.* Pl. t. 2033.

**D. Multiflorum**, Par. and Rchb. fil. See *D. Nathanielis*, *infra*.

**62. D. Nathanielis** ; Rchb. f. in Schill. Cat. Orch. Ed. 3 (1857), 26.

Leaves lanceolate acuminate, flowers very small, pedicel capillary mentum longer than the sepals, lip membranous cuneate elongate, side lobes small midlobe broad 2-lobed.

Tenasserim and Martaban, *Wallich* ; *Parish*.

Habit and foliage of *A. anceps* but the flowers are much smaller,  $\frac{1}{6}$  in. long, very membranous and have capillary pedicels. *Lip* with a flat ridge on the disk that ends abruptly opposite the side lobes. Lindley (in Journ. Linn. Soc.) has confounded this with *acinaciforme*. *Hook. f.* in Fl. Brit. Ind. v. 724-5. C. P. 266.

SYN—*D. cuspidatum* ; Lindl. in Journ. Linn. Soc. iii. 4.

*Aporum cuspidatum*, Wall. in Bot. Reg. 1841, Misc. 2.

*D. multiflorum*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 149. t. 31, f. 2. *Aporum anceps* Lindl. in Wall. Cat. 2020.

Compare *D. anceps*. *B. G.*

**D. Nodatum**, see *D. Aphroclite*.

**63. D. Nobile** Var. *Nobilis*.

Undoubtedly the largest flowered form of *D. Nobile*, yet introduced. The flowers are about 4 in. across, having broad sepals and petals, white richly suffused with rosy-purple around the anterior half, and

having an intense purplish-crimson blotch in the centre. It flowers during the winter and spring months, is very rare. *Williams*.

Neither type nor variety given as Burmese by Hook. f. in Fl. Brit. Ind.; the latter is given in Parish's list. *B. G.*

Veitch Man. Dendrob. 64.

The following is the description in Fl. Brit. Ind. v. 740 of *D. Noble*. Lindl. Gen. and Sp. Orchid. 24; Sert. Orchid. t. 3; in Bot. Reg. 1844, Misc. 48; in Journ. Linn. Soc. iii. 12.

Stems erect compressed, leaves oblong obliquely notched, flowers 2—4 subracemose on a short peduncle from the leafing or leafless stems purple or white with purple tips and lip, sepals linear-oblong obtuse-petals much broader, mentum short broad, lip subsessile broadly ovate-oblong pubescent, margins recurved, base shortly convolute.

Eastern Himalaya; Sikkim, ascending to 5000 ft., *J. D. H.*; Bho-tan *Griffith*. The Khasia Mts., *Gibson, &c.* Distrib. China.

*Stems* 1—2 ft. *Leaves* 3—4 in., coriaceous, "persistent for 2 years" *Veitch*. *Flowers* 2½—3 in. diam., variable in colour, almost racemose; bracts oblong, ¼ in. A multitude of varieties have been described, and of hybrids especially with *heterocarpum*, (See Reichb. f. in Gard. Chron. 1884, 338, 445, 576, and Veitch Man. Dendrob. 63).—*Hook. f.*

Paxt. Mag. vii. t. 7; Hartm. Parad. i. t. 11; Reichb. f. in Gard. Chron. xvii. 366; Williams Orchid Alb. t. 214; Reichenbachia ii. t. 58 (*Var. Sandersiana*); Veitch Man. Dendrob. 63, with fig.

SYN.—*D. Cærulescens*, Wall. in Lindl. Sert. Orchid. t. 18; Bot. Reg. l. c.

*D. Lindleyanum*, Griffith Notul. iii. 309 (excl. fig.); Lindl. in Journ. Linn. Soc. iii. 13.

**64. *D. pachyglossum***, Par. & Rchb. f. in Trans. Linn. Soc. xxx. 149; C. P. 145.

Young sheaths hispid, leaves very slender acuminate, flowers solitary or geminate, sepals triangular-ovate, petals narrowly linear acuminate, mentum equalling the sepals recurved obtuse, sidelobes of lip very small, midlobe minute retuse, disk 2-keeled.

Tenasserim; at Moulmein, *Parish*,

*Stem* 6—8 in., narrowed at the base and apex. *Leaves* 2—3 by  $1\frac{1}{2}$  in. *Sepals* streaked with brown. *Lip* white, with brown streaks. Reichenbach, from whom the description is taken, says, "Very like" *D. attenuatum*, Lindl. *Hook. f.* in Fl. Brit. Ind. v. 727.

**65. *D. palpebræ***, Lindl. in Journ. Hort. Soc. v. (1850) p. 33 ; in Paxt. Fl. Gard. ; 48.

Stems clavate 4-angled, leaves 3—5 oblong-lanceolate acute, flowers in loose lateral racemes (white or rose, disk of lip orange), bracts small, sepals oblong, petals broader clawed ciliolate, mentum rounded, lip oblong softly downy, base shortly clawed convolute and villously fringed.

Burma ; *Lobb*, *Berkeley*.

*Stems* 7—9 in. *Leaves* 4—6 in. *Flowers*  $1\frac{1}{2}$ — $2\frac{1}{2}$  in. diam., faintly fragrant.—Near *D. densiflorum*, but bracts very different. Nearer *D. Griffithianum*, but mentum short. *Hook. f.* in Fl. Brit. Ind. v. 750.

Veitch. Man. Dendrob. 67 ; C. P. 377.

**66. *D. panduriferum***, Hook. f.

Stems elongate cylindric grooved, leaves (on young stems only) lanceolate, racemes short 6—8-fl'd., dorsal sepal broadly ovate obtuse, petals orbicular crenate, mentum many times longer than the broadly ovate subacute lateral sepals, tip swollen, claw very long and slender, limb small deeply constricted in the middle forming lateral auricle-like side lobes and an obcordate midlobe, disk with a large transverse lamella between the side lobes.

Pegu ; at Rangoon, *Gilbert* (*Jc. in Herb. Calcutt.*)

*Stems* 2—3 ft., narrowed at the base ; internodes 1— $1\frac{1}{2}$  by  $\frac{1}{4}$  in. nodes often rooting ; sheaths membranous, white, young green, and speckled. *Leaves* few, 1— $1\frac{1}{2}$  in., acuminate. *Racemes* 1—2 in. ; bracts small ; pedicel with ovary  $\frac{1}{2}$  in. ; flowers 1 in. long ; sepals and petals green with streaks of red dots along the numerous nerves ; mentum incurved thickened towards the rounded tip, straight or slightly curved, green streaked with red ; claw of lip 3—4 times as long as the dull yellow limb, margins incurved above, below united to the walls of the mentum, anther stipitate on the top of the

column. Nearly allied to *D. tropaeoliflorum*. Also near *D. ionopus* R. f. but the flowers are not yellow with red blotches, nor is the claw of the lip thick and keeled. This will be figured in King's Annals of the Calcutta Garden. *Hook. f.* in Fl. Brit. Ind. vi. 186.

*Var. serpens.*

In the Calcutta Garden collection of drawings is one of a variety of *panduriferum*, or of a very closely allied species, marked as from Perak (*Kunstler*), with longer flexuous stems tuberous at the base, yellow sepals, and petals streaked rather than dotted with red along the nerves, and a mentum as long but not thickened towards the tip; the limb of the lip is less constricted in the middle. This may be Reichenbach's *D. ionopus*. *Hook f. l. c.*

**67. D. Parcum**, Rchb. f. in Gard. Chron. 1866 1042; Xen. Orchid. ii. t. 169.

Racemes extremely short 2—4-fl'd., petals linear-spathulate, mentum broad obtuse much longer than the oblong obtuse 3-nerved sepals, lip exceeding the sepals straight narrow with a dilated cuneiform truncate tip dull yellow speckled with purple.

Tenasserim, *Parish.*

*Stems* 12—18 in., *Racemes*  $\frac{1}{8}$ — $\frac{1}{3}$  in.; flowers  $\frac{1}{3}$  in. long greenish yellow. *Hook. f.* in Fl. Brit. Ind. v. 720.

C. P. 81.

**68. D. Parishii**, Rchb. f. in Bot. Zeit. 1863, p. 237; Xen. Orchid. ii. t. 152.

A very free flowering species. The stems from 1—2 ft. long, very thick throughout their entire length, decurved, and bearing flowers in the second year, after the leaves have fallen; the leaves oblong lanceolate, leathery, and notched at the ends. The flowers grow generally in pairs, or in threes and are of a beautiful dark rose colour, the downy lip lighter in colour along the centre, with a dark purple blotch on each side the throat. They have a strong scent of rhubarb. *Williams.*

Stems stout decurved; leaves oblong-lanceolate, bracts rather large, flowers 1—3 on a short peduncle from the leafless stems rose-purple or

white, lip with two maroon blotches, sepals oblong acuminate, petals broadly elliptic, mentum short obtuse, lip shortly clawed convolute with a small ovate obtuse tomentose and ciliate recurved limb.

*Stems* 6—12 in. ; internodes  $\frac{1}{2}$ — $\frac{3}{4}$  in. ; when old contracted in the middle. *Leaves* 3—5 in., coriaceous. *Flowers*  $1\frac{1}{2}$ —2 in. diam ; pedicels 1 in. ; bracts  $\frac{1}{4}$  in. ; limb of lip small compared with the tube ; claw with a pit and transverse ridge. *Column* white, anther purple. *Hook. f.* Fl. Brit. Ind. v. 740-1.

Upper Burma, *Berkeley*. Tenasserim, *Parish*.

Bateman in Bot. Mag. 5488 ; Jennings Orchid t. 39 ; Veitch Man. Dendrob. 68 ; C.P. 18.

**D. Paxtoni**, (Paxt.), See *D. Fimbriatum* var. *oculata*.

**D. Paxtoni**, (Lindley), See *D. Chrysanthum*.

**D. Peguanum**, Lindl. See *D. pygmaeum*.

**69. D. pendulum**, Roxb. Fl. Ind. iii. 484.

A handsome and distinct species with stout erect stems from 6—18 in. long, having large closeset swollen or knotted joints or nodes, forming depressed spheres an inch in diameter ; the flowers which grow on the older defoliated stems are abundant from the upper nodes,  $2\frac{1}{2}$  in. diam., solitary or in pairs ; the linear oblong sepals and petals wax white tipped with magenta-purple, and the broadly oblong-ovate obtuse velvety lip white with an orange-yellow blotch at the base, and magenta-purple tip. *Williams*.

Stems stout decurved, nodes sub-globose, leaves linear-lanceolate, flowers 1—3-nate on the leafless stems stoutly pedicelled white or tips purple, lip with yellow disk, sepals linear-oblong sub-acute, petals much broader, mentum obscure, lip orbicular sub-cordate pubescent ciliolate.

*Stems* 1—2 ft. ; internodes  $\frac{3}{4}$ — $1\frac{1}{2}$  in., as broad at the nodes. *Leaves* 4—5 in., membranous. *Flowers* 2— $2\frac{1}{2}$  in., variable in colour ; pedicels 1— $1\frac{1}{2}$  in. *Hook. f.* Fl. Brit. Ind. v. 741-2.

Chittagong, *Roxburgh*. Arracan, *Benson* ; alt. 2500 ft. *Williams*  
Distrib. Siam. *Hook. f.*

SYN.—*D. crassinode*, Bens. and Rchb. f. in Gard. Chron. 1869, 164; 1870, 417; Bot. Mag. t. 5766; Warn. Orchid. Alb. iv. t. 152; Veitch Man. Dendrob. 31, with fig.; C. P. 26.

? *D. polyanthum*, Wall. Cat. 2009; ? Lindl. Gen. and Sp. Orchid. 81; in Bot. Reg. 1844, Misc. 57; C. P. 340; Moulmein, *fide Wallich*.

Wallich's specimens of *D. polyanthum* are indeterminable; they are from Burma, and quite like *D. pendulum*. I doubt if Lindley's is the same plant. *Hook. f. l. c.*

Parish gives both *D. polyanthum* with reference C. P. 340, and *D. crassinode* with reference C. P. 26; the two are probably distinct. *B. G.*

*D. Wardianum*, Warner Sel. Orchid. Ser. i. t. 19.

Var. *D. crassinode* Var. *albiflora*, Bens. and Rchb. f. in Gard. Chron. 1875, 93.

A pure white variety with a lemon-coloured blotch at the base of the lip. Moulmein. *Williams*.

*D. crassinode*, Var. *Barberiana*, Bens. and Rchb. f. in Gard. Chron. 1876, 567.

A great improvement on the type. The stems are stouter and the plants grow much stronger than *D. pendulum*. The flowers are of greater substance and more highly coloured than in the type: the sepals and petals are pure white tipped with rich magenta, the lip white, tipped with the same colour, the throat and disk orange. This variety lasts a long time in perfection. Moulmein; *Williams*.

Natural Hybrid. *D. Melanophthalmum*, Rchb. f. in Gard. Chron. N.S. 1886, xxv. p. 426; 1869, 164; 1870, 417. (*Melananthum*, Hook. f. Fl. Brit. Ind. vi, 186, Suppl.)

Here is a Dendrobe apparently originated by a cross between *D. Wardianum* and *D. crassinode*. The stems are nearly those of *D. Wardianum*, though one must admit they are a little more nodate. The flowers are those of *D. crassinode Barberianum*, but there are two dark eye-spots. That gives you an idea of the plant. *Reichenbach f.*

Burma, *Williams*.

**70. *D. Pierardii*, Roxb. in Hook. Exot. Fl. t. 9; Fl. Ind. iii. 482.**

A delicately pretty species of deciduous habit. The stems are long, as much as 6 ft., moderately slender, terete, drooping, furnished with lanceolate acuminate leaves and flowering in fascicles of 2 blossoms from each node through the greater part of the length of the stem. The flowers are transparent blush white with a spathulate pale yellow lip, having the involute claw feathered with purple lines; they last about 3 weeks in beauty. *Williams*.

Common about Moulmein and probably elsewhere. *Parish*.

Stems slender pendulous, leaves sessile lanceolate acuminate, flowers 2—3 on a short peduncle from the usually leafless stems rose-cold., lip yellow, bracts small, sepals oblong-lanceolate subacute, petals broader oblong, mentum short, lip orbicular cucullate pubescent ciliate, base tubular.

*Stems* 2—3 ft., smooth. *Leaves* 2—4 in., membranous. *Flowers* 1—2 in. diam., translucent. *Hook.f.* Fl. Brit. Ind. v. 738—9.

Eastern tropical Himalaya, Sikkim. Bengal, in the Soonderbunds, and southwards to Tenasserim. *Hook.f.*

Lindley Gen. and Sp. 79; in Bot. Reg. t. 1756 (? 1750); Wall. Cat. 2007; Bot. Mag. t. 2584; Wight Icon. 908 (indifferent); Loddiges Bot. Cab. t. 750; Veitch Man. Dendrob. 69; C. P. 10.

Var. *latifolia*, Fl. des Serres, t. 955, is a doubtful plant, a good deal like *D. primulinum* in the flowers. *Hook.f.*

Var. *cucullata*; flowers smaller 1½ in. diam., pedicels shorter, lip with a longer tubular base and short limb with incurved tip. *Hook.f.*

SYN.—*D. cucullatum*, Brown in Bot. Reg. t. 548; Bot. Mag. t. 2242; Lindl. in Bot. Reg. 1844, Misc. 49; Rchb. Fl. Exot. t. 65; Walp. Ann. vi. 284.

*Limodorum aphyllum*, Roxb. Cor. Pl. i. 34, t. 41; Fl. Ind. iii. 462.

*Cymbidium aphyllum*, Swartz in Nov. Act. Ups. vi. 73; Willd. Sp. Pl. iv. 100—Sikkim Himalaya, *J. D. H.*—Lindley refers Roxburgh's *L. aphyllum* to *D. amœnum*.

*D. cucullatum* is the earliest name for the species, but it applies to an obvious variety. *Hook.f.*

**71. *D. podagraria*, Hook. f. Ic. Plant. t. 2026.**

Leaves linear-oblong or linear obtuse or emarginate, flowers small solitary on bracteate tubercles at the upper nodes or leaf axils, dorsal sepal lanceolate, petals narrow oblong-lanceolate 3-nerved, mentum longer than the ovate uncinately 7-nerved lateral sepals stout incurved obtuse, lip obcordate from a narrow base, side lobes rounded, midlobe small rounded, sinus with a plate and caruncle.

Burma ; at Attran, *Wallich*. Tenasserim, *Griffith, Parish*.

*Stem* 1—3 ft., branched ; internodes  $1\frac{1}{3}$  in. ; basal tuber 1—5 in. *Leaves*  $1\frac{1}{2}$ —2 by  $\frac{1}{4}$ — $\frac{1}{3}$  in. Flowers  $\frac{1}{2}$  in. long, white with pink lines on the lip. *Hook. f.* in Fl. Brit. Ind. v. 728.

*SYN.*—*D. Angulatum*, Wall. Cat. 2010 (not of Lindl. Gen. and Sp. Orchid.).

***D. polyanthum*, Wall. Cat. No. 2009, see *D. pendulum*.**

***D. polyphlebium*, Rchb. f. in Gard. Chron. 1887, i. 702 ; Warner's Orchid Alb. vii. t. 299, see *D. rhodopterygium*.**

**72. *D. primulinum*, Lindl. in Gard. Chron. 1858, 233 ; in Journ. Linn. Soc. iii, 12.**

A beautiful free flowering deciduous species of pendulous growth ; the stems terete and clustered, furrowed, 1 ft. or more in length, the young ones leafy at the top, leaves being oblong obtuse, and obliquely emarginate. The flowers are solitary, the oblong sepals and petals white tipped with pink, the broadly obovate downy lip pale sulphur-yellow, its sides convolute at the base and streaked with purple ; they are produced in 2 rows along the stem in April and May, and last in perfection 10 days. Best grown in a basket with moss. *Williams*.

Stems short pendulous, leaves coriaceous broadly oblong, flowers solitary on the leafless stems shortly pedicelled white or pink, lip primrose, sepals and petals subequal linear-oblong obtuse, mentum rounded, lip large shortly clawed pubescent orbicular or reniform with a short convolute base, margins everted ciliate.

*Stems* 10—12 in., often  $\frac{1}{2}$  in. diam. *Leaves* 4 in., smaller upwards. *Flowers*  $2\frac{1}{2}$  in. diam., odour of cowslips ; bracts small ; lip 2 in. diam. in Var. *gigantea*, tip rounded, acute or emarginate. Near *D. Pierardii*,



but stem shorter and stouter, sepals and petals narrower and subequal.  
*Hook. f. Fl. Brit. Ind. v. 735—6.*

Tropical Himalaya ; Nepaul and Sikkim, *Hook. f. Burma, Rangoon Agri-Horticult. Society's Collectors. B. G.*

'Trans. Russ. Hort. Soc. 1861, t. 52 ; Regel. Gartenfl. 1861, t. 326 ;  
 Williams Orchid. Alb. vi. t. 286 ; Veitch. Man. Dendrob. 70, with fig.  
 SYN.— *D. nobile*, Var. *pallidiflora*, Hook. Bot. Mag. t. 5003.

Var. *gigantea*, Veitch. Man. Dendrob. 71.

**73. *D. pulchellum***, Roxb. in Lindl. Gen. and Sp. Orchid. 82 ;  
 Fl. Ind. iii. 486 (not of Lodd.).

*D. Dalhousieanum* must take the name of *pulchellum*, Roxb., a species, which, misled by Lindley's reference to it of *D. Devonianum*, I had hitherto failed to recognize. Reverting to it for this supplement, I find nothing in Roxburgh's description and drawing to distinguish it from *Dalhousieanum* (also a native of Silhet) except the drawing of the lip, which is too obcordate, and does not represent the villous tip, or the pectinate lobes on the disk which are so conspicuous in the latter plant. On the other hand, Roxburgh describes the lip as " beautifully marked, ciliate and ramentaceous," characters that apply to *Dalhousieanum* and to no other species at all like it. In short, as with *Cælogyne nitida* and *Geodorum recurvum*, the faulty drawings, all by the same native artist, of the lips (probably in a withered state), have retarded the recognition of otherwise well marked and described species. In this view Mr. Rolfe is disposed to agree with me.

With regard to Loddige's *pulchellum* (Bot. Cab. t. 1935, and Bot. Mag. t. 5037), Rolfe (Gard. Chron. 1887, ii. 155) has shown that it is a Chinese plant (*D. Loddigesii*, Rolfe), and neither Roxburgh's *pulchellum* nor *Devonianum*. *Hook. f. in Fl. Brit. Ind. vol. vi. pp. 186—187.*

This is a beautiful large flowered evergreen species, with stoutish terete sub-fusiform stems from 4—8 ft. high, elegantly marked with reddish crimson ; it blooms on the old growths in April and May, producing drooping lateral racemes of from 5—7 flowers. These are large, fully 3 in. across, with the parts broad and strikingly effective ; the ovate sepals and much larger petals are of a pale lemon colour edged with rose ;

the lip is oblong, constricted in the middle, glandularly villous and incurved in front, where it is whitish, the base pale yellowish, marked on each side with a large oblong purple-crimson blotch, the inner edge of which passes into coloured whisker-like fringes; it lasts 4—5 days in beauty. This will grow either in a pot or a basket. *Williams.*

A noble species. Stems often 5—6 ft. long when found in damp shady forests which it affects; drooping flowers in loose racemes, near the end of the stems of 6—7 flowers 5 in. across, cream-cold., lip large saccate, but hardly slipper-shaped, with large deep blood-red blotches on the inside, the middle and front part projecting forwards and covered with a soft velvety pile. Abundant in the Tenasserim forests. The stems, however long, are but of one rainy season's growth, at the close of which they flower for the first time, while the leaves remain on, but the same stems will flower also the 2nd and 3rd year, after the leaves have fallen off, new racemes proceeding from the leaf axils next below those of the preceding year. The lip is bagged or boat-shaped, villous, with the *central margin turned outwards*, column and anther dark purple. *Stems marked with red purple lines.* *Parish.*

Stems stout, leaves linear-oblong, base cordate, racemes 5—12-fl., flowers very large rosy or yellowish with crimson on the lip, sepals oblong acute, petals much broader, mentum rounded, lip shortly clawed orbicular-oblong, tip and sides densely glandular-villous, disk with 2 pectinate fringed lamellæ. *Hook. f. Fl. Brit. Ind. v. 743—4 (D. Dalhousieanum).*

Sikkim Himalaya, *J. D. H.* Upper Assam, *Griffith.* Arracan to Tenasserim. *Hook. f.*

SYN.—*D. Dalhousieanum*, Wall. Mss. in Paxt. Mag. xi. t. 145 with tab.; Lindl. in Bot. Reg. 1836, t. 10; in Journ. Linn. Soc. iii. 18; Flor. des Serres vii. t. 698; Ill. Hortic. 1864, t. 423; Warner Sel. Orch. i. t. 22; Veitch Man. Dendrob. 35 with fig.; *Dendrob. Sp. Griff.* Ic. Pl. As. 308 tt. 5., 7. and in Notul. iii. 313, No. 7; C. P. 19.

**74. *D. pumilum*, Roxb. Hort. Beng. 61; Fl. Ind. iii. 479 (in part).**

Pseudobulbs oblong to cylindric, leaves short orbicular to elliptic

obtuse, flowers solitary shortly pedicelled, lateral sepals broadly triangular dorsal much smaller ovate, petals linear-oblong, mentum very large obtuse incurved, lip oblong or obovate-oblong with 2 rounded crisped terminal lobes.

Chittagong, *Roxburgh*. Pegu; at Rangoon Ic. in Herb. Calcut. Tenasserim, *Griffith, &c.* Perak, *Scortechini*.—Distrib. Borneo.

*Pseudobulbs* of one many-grooved internode 1—1½ in. long, sessile or stipitate. *Leaves* ½—¾ in., coriaceous, sessile. Flowers 1 in. long, white, pedicel shorter; lateral sepals 7-nerved; lip with an obscurely caruncled yellow horseshoe spot at the base of the lobes. Roxburgh's description of this has been mixed up with that of an *Eria* in Fl. Ind., doubtless through an error of a transcriber or printer; his drawing is excellent. *Hook. f.* in Fl. Brit. Ind. v. 713—14. C. P. 98.

Griff. Notul. iii. 315; Lindl. in Journ. Linn. Soc. iii. 6.

**D. pumilum**, Par. and R. fil. see *D. quadrangulare*.

**75. D. Pycnostachyum**, Lindl. in Journ. Linn. Soc. iii. 19.

Stem erect fleshy, scape terminal, raceme dense-flowered, bracts lanceolate equalling the ovary, sepals and petals lanceolate, mentum short obtuse incurved, side lobes of lip very narrow, midlobe longer ovate serrate and crisped, disk with a channelled ridge 2-fid. at the tip. Tenasserim, *Lobb*.

I have seen no good specimens, and no leaves: a drawing apparently of this species (in Herb. Hort. Calcutt.) represents a leafless stem 1 ft. long, tapering to the tip, and ending in a many-fld. raceme 4 in. long; the flowers are shortly pedicelled, white with a green lip. *Hook. f.* in Fl. Brit. Ind. C. P. 67.

**76. D. Pygmaeum**, Lindl. in Wall. Cat. 1999; Gen. and Sp. 85; in Bot. Reg. 1844, Misc. 62.

*Pseudobulbs* tufted ovoid, leaves 2—3 linear, scapes many terminal and lateral erect short dense-fld., bracts exceeding the ovary, sepals lanceolate, mentum long acute, lip obovate, side-lobes narrow subacute, midlobe triangular crisped, disk with a crenate fleshy ridge.

Prome, *fide Wallich*; Pegu, *McLelland*; Tenasserim, *Parish*. *Pseudobulbs* ½—1¼ in., of several internodes. *Leaves* caducous

Scape with *raceme* 1 in.; bracts nearly  $\frac{1}{4}$  in.; sepals  $\frac{1}{8}$  in., white or purplish: lip with purple veins. Lindley in Gen. and Sp. Orch. refers *D. Pusillum*, Don., doubtfully to this, and without a doubt in Bot. Reg., but I think incorrectly. Hook. f. in Fl. Brit. Ind. v. 717.—C. P. 339.

SYN.—*D. Peguanum*, Lindl. in Journ. Linn. Soc. iii. 19.

? *D. Pusillum*, D. Don.

**77. *D. quadrangulare***, Parish MSS. C. P. 120.

Pseudobulb narrowly clavate acutely 4-angled stipitate, leaves linear-oblong, flowers fascicled.

Tenasserim; at Moulmein, *Griffith, Parish*.

Parish considered this to be different from *D. pumilum*, and his drawing seems to confirm it; the deeply 4-grooved terminal internode or pseudobulb  $1\frac{1}{2}$ — $2\frac{1}{2}$  in. long and  $\frac{1}{2}$  in. broad, preserves its 4-angled character from its earliest stage (when only  $\frac{1}{2}$  in. long); it is supported on a stipes of 2—3 slender internodes. The flowers are quite like *D. pumilum*. Hook. f. in Fl. Brit. Ind. v. 714.

Parish remarks—

“It is often a difficult task to unravel a tangled web which a moment’s carelessness has caused. Such a tangle has gathered round *D. pumilum*.

I. Roxburgh, Vol. III, p. 479, under the head of this plant, gives a correct description of it in the first 2 paragraphs, or for some 4 lines,\* but thereupon follows to the end a long description of another and totally different plant.

II. Some years ago I found 2 small Dendrobia, one of which had short swollen (turbinate) pseudobulbs (my No. 98—See *D. pumilum*) and agreed otherwise with Roxburgh’s description. This accordingly was considered to be *D. pumilum*. The other (my No. 120), though almost exactly alike in the inflorescence, had elongated quadrangular bulbs, and being clearly a distinct plant, I named it *D. quadrangulare*,

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\* See Hook. f. under *D. Pumilum*. B. G.

a name already appropriated,\* which I was not aware of at the time. These (with drawings) were sent home to Kew, when my second plant (*D. quadrangulare*) was designated *D. pumilum*. Happening to be at Kew not long ago, I was shown an authentic specimen of *D. pumilum* and, surely enough, it was identical with my *D. quadrangulare* and not with the other or *turbinate* species.

III. In a recent description of some of my Orchids by Prof. Reichenbach published by the Linnean Society (to which some figures are appended) the artist has actually combined in *one* my *two* drawings. The bulbs will be seen, on careful inspection, to be of two forms, which are those of two distinct plants! To this moment I do not know which of the two is really Roxburgh's plant, but I incline to think it is that with the swollen or *turbinate* bulbs and not the quadrangular plant, though this is called *D. pumilum* in the Kew Herbarium."

The mistake has been apparently rectified in Flora of British India, but what is the *D. quadrangulare* mentioned by Parish as named before his plant and different from it? *B. G.*

Hooker in Fl. Brit. Ind. vi. 184, Suppl. under *D. pumilum* gives the following quotation from *Ridley in litt.* "Common at Singapore with yellow or cream coloured lip with a dark spot at the tip, or veined with red. The two forms look totally different, but I can find no structural difference. I never saw so many flowers in a head as in *D. quadrangulare*."

**78. *D. revolutum***, Lindl. in Bot. Reg. xxvi. (1840), Misc. 53, (? 110).

Stem stout, flowers solitary, pedicelled, sepals and petals revolute, dorsal sepal obovate subacute, petals narrower oblong-lanceolate, spur longer than the ovate obtuse lateral sepals, mentum funnel-shaped nearly straight subacute, lip broad, side lobes very small, midlobe rhomboidly suborbicular emarginate, sides deflexed, disk 3-nerved.

Tenasserim, *Parish*. Singapore, *Walker*. Malacca, on Mt. Ophir. *Hullett*, *Maingay* (*Kew Distrib.* 1610).

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\* For what plant? *B. G.*

*Stem* 12—18 in., internodes  $\frac{1}{2}$  in., deeply channelled. *Leaves* 1—2 in., linear-oblong or oblong emarginate, back keeled, very variable in breadth, base cordate. *Flowers* 1 in. diam. white with a brown lip, pedicel  $\frac{1}{2}$  in. *Hook. f.* in Fl. Brit. Ind. v. 732.

Bot. Mag. t. 6076; Part. Fl. Gard. i. 63, fig. 42; Walp. Ann. vi. 291; C. P. 112.

SYN.—*D. uniflorum*, Griff. Notul. iii. 305; Ic. P. Asiat. t. 305.

**79. *D. rhodopterygium***, Rchb. f. in Gard. Chron. 1875, i. 684.

This species is something in the way of *D. Parishii*; the stems however are much longer and more erect. The flowers are pink tinged with rose and instead of two blotches on each side of the base, half-a-dozen streaks of purple, while the disk is covered with little warts instead of the velvety hairs so conspicuous in *Parishii*. *Williams*.

Stems teretę decurved, leaves linear-oblong, bracts minute, flowers 1—3-nate on a short peduncle from the leafless stems rose-purple, lip with pale border, sepals oblong-lanceolate acute, petals ovate-lanceolate, lip with a cylindric convolute base streaked with purple and an orbicular erosely ciliate mouth, rough or hispid on the disk.

Habit, leaves and inflorescence of *D. Parishii*, but bracts smaller, flowers much larger, 3 in. diam., of a paler rose-purple, often mottled with white, and lip with an orbicular mouth broadly or narrowly bordered with pale yellow, no maroon blotches, the disk not downy but rough, column white, anther purple. *Hook. f.* Fl. Brit. Ind. v. 741.

Tenasserim; at Moulmein, *Boxall, Berkeley*.

Veitch Man. Dendrob. 71; C. P. 376.

SYN.—*D. polyphlebium*, Rchb. f. l. c. 1887, i. 702; Warner Orchid Alb. vii. t. 299.

Reichenbach suggests *polyphlebium* being a hybrid between *pierardii* and *rhodopterygium*. *Hook. f.*

**80. *D. Scabrilingue***, Lindl. in Journ. Linn Soc. iii. 25.

A beautiful sweet scented orchid producing its blossoms in spring. The stems are erect, a span high and somewhat clavate, with ligulate-oblong unequally emargent leaves, and numerous flowers produced

laterally in pairs on both leafless and leafy stems. When they first open the flowers have been noticed to be green or greenish white, but after a day or so they change to pure white, except the lip, which has the acute erect side lobes green streaked with purple, and the much longer recurved front lobe yellow with deep orange furrows along the disk and striped with crimson. They yield a delicious perfume similar to that of wallflowers.

It belongs to the *D. formosum* section, in which the leaf sheaths of the young growths are covered with black hairs. *Williams*.

Stems erect subclavate hirsute, leaves linear-oblong broadly 2-lobed, flowers 2-nate on a short peduncle from the leafing or leafless stems white, lip yellow with green veins, sepals ovate-lanceolate subacute, petals more oblong, mentum conical green, side lobes of oblong lip narrow, midlobe oblong retuse recurved, disk scabrid and 5-ridged.

*Stems* 6—12 in., internodes  $\frac{2}{3}$  in., nodes sometimes  $\frac{1}{2}$  in. diam. *Leaves* 2½ in., coriaceous unequally obtusely 2-fid. *Flowers* 1½ in. diam., sweet-scented; pedicels short; bracts very small. *Hook. f.* Fl. Brit. Ind. v. 735.

Tenasserim; at Moulmein, *Parish*.

Rchb. f. in Trans. Linn. Soc. xxx. p. 150; Veitch Man. Dendrob. 72; C. P. 134.

*SYN.*—*D. Hedyosmum*, Bateman in Bot. Mag. t. 5515.

### 81. *D. secundum*, Wall. Cat. 1996.

Stem stout, racemes shortly peduncled secund dense-fld., bracts small membranous, dorsal sepal ovate obtuse, petals narrower linear-oblong, mentum as long as the dorsal sepal or longer, lip spathulately oblanceolate cymbiform and entire subacute, claw saccate, disk with a semilunate transverse ridge.

Martaban, *Wallich*. Tenasserim, *Griffith*, *Helper*. Penang, *Wallich*. Distrib. Sumatra, Java, Cochin China. *Hook. f.*

*Stem* 10—24 in., pendulous, sometimes  $\frac{3}{4}$  in. diam., grooved *Leaves* very variable, 2—4 by 1—2 in. oblong to linear-oblong, obtuse or retuse. *Racemes* 2—4 in., decurved, rachis very stout; flowers hardly

expand, and vary from deep red to white, with yellow on the lip.  
*Hook. f.* Fl. Brit. Ind. v. 730.

Lindl. Gen. and Sp. 81 ; in Bot. Reg. t. 1291 and 1844, Misc. 65 ;  
Rchb. Fl. Exot. t. 269 ; Bot. Mag. t. 4352 ; De Vriese Illust. t. 6 ; Veitch  
Man. Dendrob. 72 ; C. P. 333.

SYN—*Pedilonium secundum*, Blume Bijdr. 322.

*D. purpureum*, Roxb. Fl. Ind. iii. 484.

Var. *Nivea*, Rchb. f. in Gard. Chron. 1881, i. 733.

**82. D. Senile**, Par. and Rchb. f. in Gard. Chron. 1865, 434. C. P.  
135.

One of the most curious orchids, quite dwarf in habit, stems fusi-  
form, 6 in. long, covered, as are the 2—3 leathery obovate leaves, with  
short white hairs. The flowers are bright yellow, the 3-lobed lip having  
a green blotch on each side of the disk, which is deep orange ; they are  
abundantly produced in pairs, and last a considerable time. *Williams.*

Pseudobulb short subclavate and 2—3 leaves softly hairy, flowers  
lateral solitary or 2-nate long-pedicelled golden, bracts minute, sepals  
lanceolate acute, petals broader, mentum rounded, lip broadly ovate  
obscurely 3-lobed, side lobes rounded midlobe ovate obtuse, disk  
puberulous, margins quite entire glabrous.

*Stems* 2—4 in., internodes 4—6,  $\frac{1}{2}$ —1 in. *Leaves* 2—3 in., flat,  
subacute, subfalcate. *Flowers* 2 in. diam., ochreous between the side  
lobes of the lip. *Hook. f.* Fl. Brit. Ind. v. 751.

A small species about 6 in. high, with erect rigid stems which are  
covered with white hairs. Flowers yellow. Apparently rather rare.

Swaygyeen district. *Parish.*

Xen. Orchid. ii. 143, t. 155 ; Parish in Bot. Mag. t. 5520 ; Veitch  
Man. Dendrob. 74.

**83. D. Serra**, Lindl. in Journ. Linn. Soc. iii. 3.

Stem long, leaves short ovate acute, flowers very small, very shortly  
pedicelled, mentum short, lip linear-oblong with 2 terminal auricles or  
lobules,



Penang, *Porter, Maingay (Kew Distrib. 1604)*. Singapore, *Wallich*. Perak, *Scortechini*. Distrib., Java. *Hook. f.*

*Stems* 2—3 ft., naked extremities 4—8 in., sometimes branched. *Leaves*  $\frac{3}{4}$ —1 in. *Flowers*  $\frac{1}{6}$  in., arising from a small globose tuft of rigid bracts; sepals obtuse. *Hook. f.* Fl. Brit. Ind. v. 722—3.

Given in Parish's list of Burmese Orchids with reference C. P. 374. *B. G.*

SYN.—*D. micranthum*, Lindl. l. c.; Walp. Ann. vi. 279.

*D. aloefolium*, Rchb. f. l. c.

*Aporum Serra*, Lindl. in Wall. Cat. 2021; Gen. and Sp. 71.

*A. micranthum*, Griff. in Calc. Journ. Nat. Hist. iv. 375, t. 17, and v. 369; Lindl. in Journ. L. S. l. c.

Griffith's *D. (? A.) micranthum* is unquestionably *D. Serra*: the specimen he figures has lost all of the naked end of the branch but the lowest node. *Hook. f. l. c.*

*Macrostromium aloefolium*, Blume Bijdr. 335, fig. 37.

*Oxystophyllum macrostoma*, Hassk. in Tijdsch. Nat. Gesch. x. i. 22.

**D. sphegidoglossum**, Rchb. f. in Bonpland. ii. 58, see *D. stuposum*.

**84. D. stuposum**, Lindl. in Bot. Reg. 1838, Misc. 52, and 1844, 52.

Stems rather slender grooved, leaves linear-oblong, flowers small in few-flid. racemes on the leafless stems white, sepals oblong acute lateral keeled, petals broadly ovate acute erose, mentum short, lip cuneately obovate, lobes subequal short rounded villous and ciliate with long gland-tipped hairs.

Khasia Hills, alt. 3—5000 ft. Tenasserim, *Parish*.

*Stems* 6—10 in., internodes 1—1 in. *Leaves* 3—4½ in., rather thin. *Raceme* ½—¾ in.; bracts linear-oblong, obtuse; flowers ½ in. long; pedicels capillary; lip white with red veins and a yellow band. *Hook. f.* under *D. sphegidoglossum* in Fl. Brit. Ind. v. 737.

SYN.—*D. sphegidoglossum*, Rchb. f. in Bonpland. ii. 58; in Otia. Bot. Hamb. 1878, p. 47; Walp. Ann. vi. 290 C. P. 353.

*D. stuposum* being the earlier name should be adopted. *Hook. f. Fl. Brit. Ind. vi. 186.*

**85. *D. sulcatum*, Lindl. in Bot. Reg. 1838, t. 65.**

Stems stout compressed grooved, leaves subterminal oblong acuminate, flowers many in short racemes from the leafless stems (dull orange or paler), bracts minute, sepals oblong obtuse, and rather broader obovate, petals concave mentum broad, lip broadly ovate hirsute, base saccate convolute margins ciliate revolute.

Khasia Hills, *Gibson, &c.*, not given as Burmese by *Hook. f.*

*Stems* 6—10 in.; internodes about 6, compressed, green. *Leaves* 4—8 in., coriaceous, 3-nerved. *Flowers* 1 in. diam.; sepals and petals erect. *Hook. f. in Fl. Brit. Ind. v. 749.*

*Bot. Mag. t. 6962*; *Veitch Man. Dendrob. 76*; *Rolfe, in Gard. Chron. 1887, i. 607.*

**86. *D. tenuicaule*, Hook. f.**

Stem tall very slender above, basal internode minute globose, 2nd and 3rd slender, 4th and 6th thickened elongate conical, 5th stout 1 in. thickened cylindric ribbed, leaves 3—4 in. very narrowly linear, flowers few terminating the leafless stems, dorsal sepal oblong 7-nerved, petals oblong with one branched nerve, mentum twice as long as the obtuse lateral sepals straight, lip cuneate side lobes short rounded as broad as the sessile orbicular midlobe, disk pubescent.

Andaman Islands (*Ac. in Hort. Bot. Calc.*)

*Stems* 10—12 in., sheathed at the upper nodes. *Leaves*  $\frac{1}{10}$  in. broad, acute. *Bracts* minute, pedicel with ovary slender  $\frac{1}{2}$  in.; flowers  $\frac{1}{2}$ — $\frac{2}{3}$  in. long, pure white; petals as long as the dorsal sepal; mentum trumpet-shaped, tip acute yellowish; lip sessile at the base of the mentum, membranous, delicately veined; column very short, 3-toothed; anther hemispheric.—Described from a drawing (that will be published in *Kings Annals of the Calcutta Garden*) and dried flowers. *Hook. f. in Fl. Brit. Ind. vi. 184. Suppl.*

**87. *D. terminale***, Par. and Rchb. f. in Trans. Linn Soc. xxx. p. 149 ; C. P. 33.

Leaves small ovate or ovate-oblong acute, flower terminal solitary large, mentum broad much longer than the rest of the flower, lip triangular-cuneate truncate or 2-lobed.

Tenasserim, *Parish* ; Malacca (*lc. in Herb. Calcutt.*).

*Stems* 4—6 in. *Leaves*  $\frac{1}{2}$ — $\frac{3}{4}$  in. *Flower*  $\frac{2}{3}$  in. long, white, lip yellowish.—The large flower at once distinguishes this from its allies. *Hook. f. Fl. Brit. Ind. v. 725.*

***D. thyrsiflorum***, Rchb. f. see *D. densiflorum*.

**88. *D. tortile***, Lindl. in Gard. Chron. 1847, 797. with fig.

A pretty dwarf species with erect clavate furrowed stems a span high, few linear retuse leaves confined to the young shoots, and lateral 2-fld. peduncles on the leafless stems. Flowers large, the sepals and petals white, just tinged with purplish-rose, waved and spirally twisted and the large conchiform pubescent lip lemon-yellow streaked with purple at the base. Flowers May and June. *Williams.*

Stems subfusiform compressed, leaves narrow retuse, racemes 3—6 fld. on leafless stems, flowers pale or rose-lilac, lip yellow, sepals and petals oblong undulate and twisted, mentum conical, lip subsaccate with a dilated orbicular everted erose limb pubescent and ciliate.

*Stems* 6—12 in.,  $\frac{3}{4}$  in. broad, grooved and ribbed. *Leaves* 3—4 in., subcoriaceous, recurved. *Flowers* 3—3 $\frac{1}{2}$  in., diam.—Near *primulinum* and *Pierardii*, according to Veitch, with lip like *lituiflorum*. *Hook f. Fl. Brit. Ind. v. 744.*

Chittagong and Burma to Tenasserim, *Lobb, &c.*

Bot. Mag. t. 4477 DePuydt Les Orchids, 54, with fig.; Veitch Man. Dendrob. 81 ; Walp. Ann. vi. 284 ; C. P. 17.

Var. *rosea*, resembles the type in every respect except that the flowers are of a delicate rose shaded with yellow. Blooms in May and June. *Williams.*

**89. *D. transparens***, Wall. Cat. 2008/1.

A pretty small flowering orchid which blooms in the same way as

*D. nobile*. The stems are erect, terete, about one ft. long, the growing ones bearing linear-lanceolate leaves. The flowers which grow in pairs along the stems, are of a pale transparent purplish lilac and the obovate oblong ciliolate lip has a large deep blood coloured blotch passing into striæ at the edges. *Williams*.

As Lindley says, "very like *D. Pierardii*" but generally brighter in colour, with stems much shorter and stiffer, about 1 ft. I have only met with it once or twice on the mountains near Toungoo. *Parish*.

Stems slender pendulous, leaves linear-lanceolate acute, flowers in pairs on the leafless stems white and pink, lip purple within, bracts very large, sepals lanceolate acute, petals broader ovate, mentum conic, lip clawed elliptic-oblong from a convolute cuneate base obtusely lobed recurved pubescent.

Stems 11—18 in., internodes 1—1½ in. Leaves 3—4 in. Flowers 1½ in. diam.; bracts ⅓—½ in., oblong, acute; pedicels short; lip with a broad purple single or double blotch. *Hook. f. Fl. Brit. Ind. v. 738*.

Tropical Himalaya; from Kumaon, alt. 3000 ft., eastwards; Assam, the Khasia and Garrow Hills. *Hook. f. Toungoo Mts. Parish*.

Lindl. Gen. and Sp. 79; in Bot. Reg. 1844, Misc. 62; in Journ. Linn. Soc. iii. 12; Bot. Mag. t. 4663; Paxt. Fl. Gard. i. 134, t. 27; Jard. Fleur. t. 68. Veitch Man. Dendrob. 81; C. P. 185.

SYN.—*D. Henshallii*, Rchb. f. in Bonpland. iii. 226.

—Dendrob., Griff. Notul. 198, No. 1135.

Var. *Alba*. Rolfe.

A beautiful pure white variety has appeared in the collection of Hamar Bass Esqr. The flowers do not show the slightest trace of colour anywhere. *Williams*.

## 90. *D. trigonopus*, Rchb. f. in Gard. Chron. 1887, ii. 682.

Stem short and leaves at first and sheaths hispidulous, leaves 1—3 subterminal, peduncle 1-fld. (? always), flowers yellow, ovary trigonous sepals ligulate acuminate, petals shorter-broader, mentum obtuse, lip clawed dilated 3-fld, side lobes quadrate and semi-orbicular, midlobe denticulate, disk very rough.

Burma, (*Hort. Low*).

*Stem* at length sulcate. *Leaves* oblong-ligulate. *Flowers* larger than *D. Cambridgeanum* (*D. ochreatum* Lindl. A non-Burman species with flowers 3 in. diam. See Fl. Brit. Ind. v. 747-8. *B. G.*), as thick in texture as *Vanda tricolor* (a non-British Indian species. From Java? *B. G.*). *Lip* yellow, with a row of red transverse lines superposed on each side of the disk between the side lobes, and a green area on the midlobe.—Discript. from the author. *Hook. f.* Fl. Brit. Ind. v. 751.

**91. *D. virgineum***, Rchb. f. in Gard. Chron. 1884, ii. 520 ; 1888, ii. 725.

A beautiful orchid in the way of *D. infundibulum*, with nigro-hirsute stems, the leaves oblong-ligulate bilobed at the apex, and nearly twice as broad as those of that species. The flowers which are numerous, and grow in terminal racemes are only  $\frac{2}{3}$  the size of those of *D. infundibulum*. They are waxy white, greenish on the chin behind, and marked from the base of the 3-lobed lip to the base of the roundish emarginate crenulate midlobe by 2 singular thickened light reddish lines, and having also a reddish tint at the base of the column. Flowers during autumn. *Williams*.

Hirsute with black hairs, leaves oblong-ligulate, tip 2-lobed, raceme terminal, lateral sepals tirangular obscurely keeled, dorsal oblong-obtuse, petals rhombic, mentum short conical, side lobes of lip  $\frac{1}{2}$ -ovate crenulate, midlobe rounded notched crenulate, disk with 2 parallel depressed ridges.

Like *D. infundibulum*, but leaves nearly twice as broad, flowers one third smaller, ivory white, ridges of lip red.—Discript. from the author. *Hook. f.* Fl. Brit. Ind. v. 722.

Burma (*Hort. Low*).

**92. *D. Wardianum***, Warner Sel. Orchid. i. t. 19. A magnificent species. The stems are stout, terete, somewhat thickened at the nodes, pendulous, from 2—3 ft. long, the younger ones furnished with oblong-lanceolate acute leaves, which fall away, after which the flowers are produced in twos or threes, each flower measuring upwards of  $3\frac{1}{2}$

in. diam. The colour of the sepals and petals is white tipped with magenta, the great cucullate lip having the same colours and in addition a large rich orange blotch on the convolute base and disk, the throat spotted on each side with deep crimson. It blooms about May and continues a considerable time in perfection. *Williams.*

Stems stout erect or pendulous, leaves 3—4 in. linear-lanceolate, flowers 1—2 on a very short peduncle from the leafless stems, white or tips purple, lip ochreous with maroon blotches, sepals oblong acute, petals twice as broad, mentum rounded, lip clawed, mouth orbicular or ovate subcordate, densely pubescent, margins recurved, base short convolute.

Very near and perhaps only a form of *Falconeri*, from which it is difficult to distinguish some of the published drawings; stem stouter, sometimes 1 in. diam., not so nodose. *Hook. f. Fl. Brit. Ind. v. 742.*

Assam; the Khasia Hills, and Burma. *Hook. f. Ruby-mines, Upper Burma. Williams.*

Ill. Hort. 3 ser. t. 277; Jennings, Orchid. t. 2; Gard. Chron. N. S. viii. 240, fig. 50 (specimen plant); Reichenbachia i. t. 9; Veitch Man. Dendrob. 83, with fig; Gardening World, v. p. 517.

SYN.—*D. Falconeri* Var., Bot. Mag. t. 5058.

I have referred to this the *D. Falconeri*, Var. "sepalis petalisque obtusioribus" of Bot. Mag. *Hook. f. l. c.*

Var. *Lowii*, Floral Mag. N. S. t. 212. Lindenia, v. t. 225.

A magnificent variety altogether stouter in all its parts than the type. It sometimes produces growths as much as 5 ft. in length and of great thickness, and is more vigorous and erect in habit. The flowers are of the same colours and similarly marked, but larger and of stouter substance. It blooms during the winter and spring months. Burma. *Williams.*

SYN.—Var. *gigantea*, Williams Orchid Alb. iii. t. 113.

Var. *candida*. Rchb. f. in Gard. Chron. 1876, ii. 460.

A fine white flowered variety. It is very rare and was a chance importation amongst a large consignment of Orchids from Assam. *Williams.*

SYN.—*D. album*, Orchid Alb. x. t. 450.

Var. *Watsoni*, Rehb. f. ? *Parish*.

93. *D. xanthophlebium*, Lindl. in Gard. Chron. 1856, No. 196; and 1857, 268; in Journ. Linn. Soc. iii. 16.

A very pretty species with erect terete angled stems about 1 ft. long, and rather thicker than a swan's quill. The leaves, produced on the young stems only, are linear-lanceolate and obliquely emarginate. The flowers grow from the joints of the older stems, generally in pairs, sepals and petals pure white, and the lip 3-lobed, the side lobes large, erect, veined with deep orange, the front lobe also roundish, but much undulated, downy, orange yellow bordered with white as in the side lobes. The spur is as long as the chin. *Williams*.

Flowers on the leafless branches, 2-nate white with yellow and brown veined lip, sepals and petals lanceolate acute, mentum conical acute, lip broad, side lobes large triangular subacute, midlobe orbicular crisped scabrid, disk fleshy.

Habit and foliage of *D. longicornu*, but stems glabrous, striped green and white, flowers axillary, much more open, 1—2 in. diam. *Hook. f.* Fl. Brit. Ind. v. 733.

Hooker describes the habit and foliage of *D. longicornu*, (a non-Burman species) as sheaths hirsute, flowers lateral and terminal. *Stems*, 6—12 in., rather slender, flexuous; internodes 1—1½ in. *Leaves*, linear-lanceolate, unequally obtusely 2-fid. *B. G.*

Tenasserim; Moulmein, alt. 4500 ft., *Parish, Lobb*.

Batem. in Bot. Mag. under t. 1515; Veitch Man. Dendrob. 84;

SYN.—*D. marginatum*, Batem. l. c. t. 5454.

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## KEY TO SPECIES.

DENDROBIUM,\* *Swartz*.

Epiphytes; stems elongate or pseudobulbous. *Leaves* never plaited.

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\* See Appendix A. Genus 8.

*Flowers* racemose, often large and handsome. *Sepals* subequal, lateral, obliquely adnate to the foot of the column, and forming with it a sac or mentum. *Lip* contracted at the base, rarely clawed, adnate to and incumbent on the foot of the column, side lobes embracing the column or spreading or O, terminal narrow or broad, flat, convex, concave or saccate, disk often lamellate. *Column* short, foot long or short, top angled or 2-toothed; anther 2-celled; pollinia 4, free, ovoid or oblong, compressed, closely collateral in pairs in each cell.

The following attempt to arrange the Indian species of this vast and very intricate genus into definable groups is open to much criticism in detail. It has entailed many months of labour, and it must stand or fall according to the verdict of those who may use it.

### SERIES I.

#### Section I. SARCOPODIUM.

\* *Flowers solitary.*

No. 23, *D. caelogyne*.

\*\* *Scape several-fl'd.* \*

No Burmese species.

#### Section II. BOLBODIUM.

No. 74, *D. pumilum*; No. 77, *D. quadrangulare*.

#### Section III. CADETIA.

No. 59, *D. Macraei*.

#### Section IV. STACHYBIUM.

\* Stem simple or nearly so, often a small pseudobulb.

† Flowers small (except *D. ciliatum*). Petals not broader than the dorsal sepal.

§ *Side lobes of lip strongly inciso-serrate.*

No Burmese species.

§ § *Side lobes of lip entire, serrulate or crenulate.*

No. 30, *D. cuspidatum*; No. 76, *D. pygmaeum*; No. 75, *D. pycnostachyum*; No. 50, *D. incurvum*; No. 22, *D. ciliatum*.



† † *Flowers rather large. Petals much broader than the dorsal sepals.*  
No. 42, *D. Fytcheanum*.

\* \* *Stems long, copiously branched. Flowers small.*  
No. 67, *D. parcum*.

#### Section V. FORMOSÆ.

No. 7, *D. Andersonii*; No. 18, *D. cariniferum*; No. 51, *D. infundibulum*; No. 40, *D. formosum*; No. 4, *D. albo-sanguineum*; No. 34, *D. draconis*; No. 57, *D. Lubbersianum*; No. 91, *D. virginicum*.

### SERIES II.

#### Section VI. APORUM.

\* *Flowers on the leafless extremities of the branches.*

No. 83, *D. Serra*.

\* \* *Flowers in terminal heads of many bracts.*

No Burmese species.

\* \* \* *Flowers in lateral or lateral and terminal heads of many bracts.*

No. 35, *D. eulophotum*; No. 10, *D. atropurpureum*.

\* \* \* \* *Flowers axillary or terminal, bracts minute, inconspicuous.*

No. 6, *D. anceps*; No. 62, *D. Nathanielis*; No. 87, *D. terminale*.

#### Section VII. STRONGYLE.

No. 1, *D. acerosum*.

#### Section VIII. VIRGATÆ.

\* *Lower nodes of stem not swollen. Mentum long or short.*

No. 11, *D. bambusæfolium*; No. 64, *D. pachyglossum*.

\* \* *Lower internodes of stem tuberous or fusiform. Mentum equalling or exceeding the lateral sepals.*

No. 27, *D. crumenatum*; No. 71, *D. podagraria*; No. 86, *D. tenuicaule*.

#### Section IX. BREVIFLORES.

No. 13, *D. bicameratum*.

## Section X. PEDILONIUM.

No. 29, *D. cumulatum* ; No. 52, *D. ionopus* ; No. 66, *D. panduriferum* ; No. 81, *D. secundum*.

## Section XI. DISTICHOPHYLLÆ.

No. 78, *D. revolutum*.

## Section XII. EUDENDROBIUM.

\* Mentum as long or nearly as long as the dorsal sepal. Flowers like those of Section *Formosæ*, but lateral, yellow, or white with yellow or red markings ; lip usually narrower than broad, very narrow in *D. nutans*, *Jerdonianum* and *Arachnites*. (See also *D. amœnum* for long spur).

No. 9, *D. arachnites* ; No. 54, *D. lassioglossum* ; No. 58, *D. luteolum* ; No. 93, *D. xanthophlebium*.

\* \* Mentum short conical or rounded (long in *D. amœnum*). Flowers white or more or less purple. Lip not calceolar. (*Porphyrantha*).

† Petals as narrow as the sepals or narrower. Lip narrower than broad.

No. 80, *D. scabrilingue*.

† † Petals as narrow or narrower than the sepals. Lip as broad as long.

No. 72, *D. primulinum* ; No. 25, *D. cretaceum* ; No. 26, *D. cruentum*.

† † † Petals broad. Lip narrower than broad.

a, *Flowers in short few-fl'd. racemes*.

No. 84, *D. stuposum*.

β. *Flowers solitary or 2—4 on a very short peduncle*.

No. 48, *D. heterocarpum* ; No. 89, *D. transparens* ; No. 5, *D. amœnum* ; No. 60, *D. marmoratum*.

† † † † Petals much broader than the sepals. Lip as broad, as long or broader.

§ Flowers solitary or 2—3-nate on a short peduncle or simply pedicelled. Margin of lip entire or slightly erose.

a. *Internodes cylindric*.

No. 70, *D. Pierardii* ; No. 28, *D. crystallinum* ; No. 12, *D.*

*Bensoniæ* ; No. 24, *D. crepidatum* ; No. 56, *D. lituiflorum* ; No. 63, *D. nobile* var *nobilius* ; No. 68, *D. Parishii* ; No. 79, *D. rhodopterygium*.

β. *Internodes swollen at the top (slightly in D. gratiosissimum).*

No. 69, *D. pendulum* ; No. 39, *D. Findlayanum* , No. 36, *D. Falconeri* ; No. 92, *D. Wardianum* ; No. 45, *D. gratiosissimum* ; No. 8, *D. Aphrodite*.

§ § Flowers solitary, 2-nate or racemose. Lip fimbriate.

No. 32, *D. Devonianum* ; No. 73, *D. pulchellum* ; No. 88, *D. tortile*.

\* \* \* Mentum short. Lip calceolar (pyriform or hemispheric with inflexed margins). Flowers pink, coppery or yellow.

No. 16, *D. calceolaria* ; No. 21, *D. chrysocrepis*.

\* \* \* \* Mentum short. Lip not calceolar. Stem often swollen at the very base. Flowers golden yellow (or pale pink in *D. Farmeri*. Mentum long in *D. lamellatum*).—*Xanthina* or *Holochrysa*.

† Stem terete (not clavate). Flowers racemose.

§ *Lip fimbriate.* (See also *D. Gibsonii*).

No. 38, *D. fimbriatum* ; No. 15, *D. Brymerianum* ; No. 61, *D. moulmeinense*.

§ § *Lip with the margin entire or erose (subfimbriate in D. Gibsonii).*

No. 44, *D. Gibsonii* ; No. 33, *D. dixanthum* ; No. 14, *D. binocularis*.

† † Stem terete (not clavate). Flowers solitary or 2—3. (See also *D. aggregatum*).

No. 19, *D. chrysanthum* ; No. 47, *D. Harveyanum*.

† † † Stem clavate.

§ *Flowers racemose or 1—2 in. form of D. aggregatum. Petals in all but D. lamellatum broader than the sepals.*

No. 31, *D. densiflorum* ; No. 85, *D. sulcatum* No. 46, *D. Griffithianum* ; No. 53, *D. lamellatum* ; No. 3, *D. aggregatum* ; No. 20, *D. chrysotoxum* ; No. 37, *D. Farmeri* ; No. 65, *D. palpebræ* ; No. 17, *D. capillipes* ; No. 90, *D. trigonopus* ; No. 82, *D. senile* ; No. 43, *D. Galliceanum*.

## Tribe II. EPIDENDREÆ.

Pollen-masses attached to a distinct caudicle, or joined together by some elastic material, but without a gland.

**Eria**, including **Ania** (**Tainia**, Blume).

A genus which includes plants of widely different size and appearance—some being small stemless plants with flattened pseudobulbs, not more than  $\frac{1}{4}$  in. high, bearing a pair of small leaves and 1--2 obscure flowers in their axis; others being 1 ft. or more high, with short or lengthened pseudobulbs, and leaves leathery and smooth, or thin and plicate and variously disposed. The inflorescence also is various, being either in lateral or axillary racemes, or in dense heads, or consisting of solitary flowers on a thin peduncle. It is distinguished from *Dendrobium* by having 8 pollen-masses, instead of 4, which are round or pear-shaped and united in one or two bundles at their base by an elastic cobwebby material, not free as they are in that genus. The lip, articulated with the much prolonged and projecting base of the column, is commonly 3-lobed, and has crested or raised lines on its disk. *Parish*.

Though combined by Parish in the above description, *Eria* and *Tainia* are treated as distinct genera by *Hooker*, and are separately grouped in this book.

1. **E. Acervata**, Lindley in Journ. Hort. Soc. 1851, 57, *with wood-cut*, and in Paxt. Fl. Gard. i. 170.

Pseudobulbs crowded, leaves 3—5 oblanceolate flaccid, racemes and flowers glabrous, scape interfoliar, bracts lanceolate, lateral sepals ovate-lanceolate acuminate 5—7-nerved, petals linear-oblong or obovate with 3 median ridges, side lobes about the middle incurved, midlobe ovate or orbicular, column very short.

Tenasserim, *Parish*.

*Pseudobulbs* 1—2 in., ellipsoid, grooved or flask-like and flattened if too crowded, not lengthening into long stems. *Leaves* 4—8 in., obtuse or acute, pale green, many nerved. *Racemes* 2—3 in., slender; pedicels with ovary  $\frac{3}{4}$ —1 in.; bracts half as long; flower broad white or yellowish, membranous. The texture of the leaves is peculiar. In Herb. Calcutt. is a drawing of a Sikkim plant which I take to be a

form of this with a more conical incurved mentum. Parish's Tenasserim plant has short broad leaves of a different texture. *Hook. f.* in *Fl. Brit. Ind.* v. 796.

*Rchb. f.* in *Gard. Ann.* 1878, 106; *Hook. f. Ic. Plant. t.* 1849; *Walp. Ann.* vi. 269; *C. P.* 276.

*SYN.*—*Dendrobium seriatum*, Wall. MSS.

**E. Affinis**, Griff. *Notul.* iii. 297 see *E. bractescens* Var.

**2. E. Andamanica**, *Hook. f. Ic. Pl. ined. t.* 2073.

Pseudobulbs as in *E. Flava*, leaves elliptic-lanceolate, lateral sepals  $\frac{3}{4}$  in. long acuminate 4-nerved, petals oblanceolate 5-nerved, lip 1 in. long narrowly oblong from a broad claw pubescent, side lobes narrow acute, axis thickened, midlobe as broad but much shorter, subquadrate 2-fid. veined, column long.

South Andaman Islands. *Kurz.*

I advance this as a species with great hesitation, but the long column, nearly  $\frac{1}{2}$  as long as the dorsal sepal, and the corresponding lip long are very strong characters (if constant). *Hook. f.* in *Fl. Brit. Ind.* v. 801.

**E. Ania**, *Rchb. f.* in *Walp. Ann.* see *Tainia Latifolia*.

**3. E. Biflora**, Griff. *Notul.* iii. 302 (not of Lindl.).

Stem clavate, internodes very short, leaves elliptic-lanceolate, scape very short lateral 2-fid., bracts ovate-cordate, flowers very small glabrous, sepals oblong-lanceolate and linear-oblong petals obtuse 3-nerved, mentum short incurved, disk with 2 broad lamellæ and a median ridge, column very short.

Tenasserim; at Mergui, *Griffith.*

*Stems* 4—6 in., tufted, slender below; internodes  $\frac{1}{2}$  in., terete. *Leaves* 3 in. *Scape*  $\frac{1}{8}$  in.; bracts twice as long; flower  $\frac{1}{4}$  in. diam., yellow-white. Lindley in founding his *E. biflora* on Griffith's *Trichotosia biflora*, overlooked Griffith's *E. biflora*. *Hook. f.* in *Fl. Brit. Ind.* v. 800.

4. *E. Bractescens*, Lindley in Bot. Reg. 1841, Misc. 18; 1844, t. 29.

Leaves 2—3 oblong, racemes slender and long pedicelled white flowers glabrous or puberulous, bracts large, lateral sepals  $\frac{1}{4}$ — $\frac{1}{3}$  in. ovate-lanceolate acuminate falcate and linear-oblong petals 5-nerved, mentum conical subacute, hypochile cuneate-obovate with 3 thickened ridges, the lateral short, side lobes pink rounded, midlobe quadrate.

Tenasserim; at Mergui, *Parish*. Singapore, *Cuming* (*Hort. Loddiges*).

*Pseudobulbs* 1—1  $\frac{1}{2}$  in., crowded, oblong, 2—3-nodal. *Leaves* 3—4 in., obliquely 2-fid. Raceme suberect; bracts linear-oblong or elliptic; lower  $\frac{2}{3}$  in., empty, margins recurved; pedicel very slender, with the ovary 1 in.; column rather long. *Hook. f.* in Fl. Brit. Ind. v. 796—7.

Walp. Reg. vi. 277.

Var. ? *Kurzii*.

*Pseudobulbs* 2—3 by  $\frac{1}{2}$ —1 in. diam. brown, leaves 3—5 by 1  $\frac{1}{2}$ —2 in. elliptic shortly petioled, bracts elliptic flat tipped with pink, flowers much larger white, ridges of lip yellowish, midlobe orbicular-cordate. *Hook. f.* Fl. Brit. Ind. v. 796—7.

SYN.—*E. Kurzii*, T. Anders. MSS.

Andaman Islands, *Is.*, in *Herb. Calcutt.*

Var. ? *Affinis*.

*Pseudobulbs* elongate rugose, leaves lanceolate, bracts yellowish tinged with brown, racemes sparsely pubescent, flower white, base of green lip pale orange, foot of column red.

SYN.—*E. Affinis*, Griff. Notul. iii. 297. (Lindley Journ. Linn. Soc. iii. p. 54; C. P. 196. *B. G.*)

Mergui, *Griffith*, who suggests its being a variety of his *E. pulchella* (*Griffithii*, R. f.) *Hook. f.* in Fl. Brit. Ind. v. 797.

5. *E. Oncolor*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 148; C. P. 128.

*Pseudobulbs* fusiform, leaves linear-lanceolate, racemes suberect few-fid. sparsely pubescent, bracts small ovate-lanceolate, lateral sepals

$\frac{1}{3}$  in. ovate-lanceolate acuminate and oblong acute petals 3—5-nerved, hypochile oblong, base narrow cuneate, sidelobes very narrow, disk with a thick ridge, midlobe orbicular retuse apiculate.

Tenasserim. *Parish*; on Moolyet, *Gallatly*.

*Pseudobulbs* 1—3 in., young clothed with truncate cupular imbricating sheaths. *Leaves* 4—6 in., very narrow, rather membranous. *Racemes* very slender; flowers 2—4, pale yellow-green; mentum obtusely triangular; epichile dirty yellow; column rather long.

Described chiefly from *Parish*'s drawing. Very like *Griffithii*, except in the small bracts. *Hook. f.* in Fl. Brit. Ind. v. 798.

**6. *E. Convallarioides***, Lindley, in Wall. Cat. 1975; in Journ. Linn. Soc. iii. 53; Gen. and Sp. p. 70; in Bot. Reg. 1841, t. 62, Misc. 58, and 1847, t. 63.

Stem after flowering very stout, leaves elliptic-lanceolate acuminate plicate, flowers in nodding oblong spikes small densely crowded, concealing the membranous bracts, sepals very broad obtuse 5—7-nerved, mentum rounded, petals 3-nerved, lip cuneate truncate or with a broadly triangular warted tip.

Tenasserim, *Parish*. Tropical Himalaya, from Kumaon, alt. 4000 ft., *Strachey and Winterbottom*, eastwards to the Khasia and Naga Hills, ascending to 5000 ft.

*Stem* after flowering 2—8 in., Sometimes 1 in. diam. *Leaves* 4—7 by 1—2 in., loosely sheathed. *Scape* 2—3 in.; spike as long, ovoid; *flowers* subglobose, glabrous or sparsely pilose, white or straw-coloured; *bracts* equalling the ovary, lowest longest. *Capsule*  $\frac{1}{3}$  in., ellipsoid. *Hook. f.* Fl. Brit. Ind. v. 791.

Wall. Pl. As. Rar. ii. 159; Walp. Ann. vi. 276; C. P. 141.

SYN.—*Octomeria Spicata*, Don Prodr. 31.

*O. Convallarioides*, Wall. MSS.

*Pinalia Alba*, Ham. MSS.

Var. *Major*, Lindl. in Bot. Reg. 1847, t. 23, is only a large specimen. *H. f.*

**7. *E. Dasyphylla***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 147; C. P. 79.

Hirsute all over, stems interlaced, leaves  $\frac{1}{4}$ — $\frac{3}{4}$  in., sessile fleshy elliptic-obovate, flowers very small solitary shortly peduncled.

Pegu, *Kurz*; Tenasserim, *Helfer*, (*K. D.* 5382), *Parish*.

*Stems* as thick as a sparrow-quill. *Leaves* subacute, convex on both surfaces. *Scape*  $\frac{1}{4}$ — $\frac{1}{2}$  in.; bracts cupular; sepals 5-nerved, dorsal very small, lateral triangular, acute; mentum large, rounded; petals broadly oblong, 1—3-nerved; lip large, cuneately obovate, sidelobes small, midlobe broader, nerves strong; anther beaked; pollinia equal, pyriform. *Hook. f.* in *Fl. Brit. Ind.* v. 808.

**8. *E. Dasypus***, *Rchb. f.* in *Bot. Zeit.* 1864, 415, (? 416).

*Pseudobulb* cylindric, leaves 2—3 narrowly oblanceolate obtuse, racemes lateral slender white-woolly few-fl., bracts broadly ovate apiculate, pedicels slender and ovate oblong obtuse 3—4-nerved, sepals woolly, petals oblong 3-nerved, lip cuneate-obovate, with 3 median ridges, sidelobes oblong, almost as long as the transverse midlobe, column long.

Tenasserim; at Mergui, *Parish*.

*Pseudobulbs*  $1\frac{1}{2}$ —2 in., as thick as the little finger, erect. *Leaves* as long. *Racemes* 1 in. very slender; bracts membranous, apiculate; pedicel  $\frac{1}{3}$  in.; sepals  $\frac{1}{4}$  in.; mentum rounded, subincurved. *Hook. f.* in *Fl. Brit. Ind.* v. 802.

C. P. 235.

***E. Discolor***, *Lindl.* in *Journ. Linn. Soc.* Non-Burman, see *E. Pulchella*.

**9. *E. Elongata***, *Lindl.* in *Journ. Linn. Soc.* iii. 49.

Characters *E. Flava*, but spikes often much longer, flowers smaller, often pedicelled, petals oblanceolate.

Tenasserim and Ava, *Wallich*, *Griffith*, *Lobb*, *Parish*.

SYN.—*E. Flava*, *Griff.* *Notul.* iii. 301; *Wall Cat.* 1973/3 (in part.)

I doubt this being more than a variety of *E. Flava*; but there may be several species included under this and *E. Flava*. *Hook. f.* in *Fl. Brit. Ind.* v. 801.

C. P. 235.



For further description see *E. Flava* under *E. Flava* Var. *Lanata*, *B. G.*

**10. *E. eriopsidobulbon.*** Par. and Rchb. f. in Trans. Linn. Soc. xxx. 148; C. P. 281.

Leaves 2—3 narrow, spike short puberulous, bracts equalling the very small glabrous flowers, lateral sepals ovate-lanceolate obtuse and linear-oblong acute petals 3-nerved, mentum short incurved, lip obovate with 2 thickened arched ridges on the disk, sidelobes above the middle midlobe small semicircular 5-ridged; column long.

Tenasserim; at Maulmein, *Parish.*

*Pseudobulbs* 2 in., oblong or ovoid. *Leaves* 4—6 in., linear-lanceolate nerves slender. *Spike* 2 in.; nerves of sepals and petals quite simple *Hook. f.* in Fl. Brit. Ind. v. 796.

**11. *E. Extinctoria*,** Oliver in Bot. Mag. t. 5910.

*Pseudobulbs* round, flattened and even depressed on the top, growing in small crowded patches, about  $\frac{1}{4}$  in. across and the same in height, bearing when fully matured in the rainy season, one small ovate pointed leaf in the centre. Before the dry season has well set in, and the plant flowers (the only time when it is likely to attract attention) these have fallen off and, in its place, exactly in the axis of the bulb, stands a slender erect peduncle about 2 inches high, which gradually swelling into the germ, terminates in a solitary flower, about  $\frac{1}{2}$  in. long. Upper sepal ovate acute, lateral sepals same general shape, but produced downwards and adnate to the prolonged column, which ends in a blunt, rounded or slightly notched spur. Petals smaller lanceolate. Lip 3-lobed, middle lobe large and itself 2-lobed, segments rounded, lateral lobes smaller, rounded and crenate. The lip tapers to a claw attached to the foot of the column, and has three raised lines along its length. Colour white tinged with pink; the three papillose ridges of the lip and intermediate space are orange-yellow, with just a tinge of pink. Base of column inside yellow. Spur greenish. Anther blotched with deep purple red on each side. I have here given the colours as seen and carefully drawn by myself.

I consider the fig. in Bot. Mag. (5910), much too highly coloured, and the pollen masses to be incorrectly drawn by the artist. I find them 8, but in two bundles of 4, nearly round, united by their suddenly tapering caudicles, by an elastic cobwebby substance. *Parish*.

Tenasserim, at Maulmein, *Griffith, Parish*.

Hook. f. in Fl. Brit. Ind. v. 788 ; C. P. 308.

SYN.—*Dendrob. Extinctorium*, Lindl. in Bot. Reg. sub. t. 1756, and in Journ. Linn. Soc. iii. p. 11 ; Rchb. f. in Walp. Ann. vi. C. P. 308.

## 12. *E. Flava*. Var. *Lanata*. Lindl.

Flowers smaller, lip narrower (*than the type*) midlobe purplish with thickened nerves on the disk. *Hook. f.* in Fl. Brit. Ind. v. 801.

Tenasserim, *Griffith (Kew Distrib. 5123)*, *Helper (Kew Distrib. 5122)*. Sikkim Himalaya, *J. D. H.*

SYN.—*E. Lanata*, Griff. Notul. iii. 301 ; Lindl. in Journ. Linn. Soc. iii. 49.

In connection with the above I give the description of *E. Flava*, which is not a Burman species. *B. G.*

Pseudobulbs large 3—5-leaved, scape and sessile flowers white tomentose, lateral sepals  $\frac{2}{3}$  in. ovate-lanceolate obtuse 9-nerved, mentum subcylindric, petals obtuse 3-nerved, hypochile broadly oblong puberulous, lobes short broad, epichile subquadrately rounded.

Tropical Himalaya, from Garwhal eastwards to Bhotan.

*Pseudobulbs* 3—4 in. ; base sheathed ; young leafy throughout.

*Leaves* 6—10 in., petioled, acuminate, often loaded with conceptions. *Scape* 6—10 in., stout ; bracts  $\frac{1}{2}$ —1 in., ovate, acuminate ; ovary  $\frac{2}{3}$ —1 in. ; flowers yellow with purplish markings on the disk of the lip, which is tumid or variously thickened, claw very broad ; column short, broad. *Hook. f. l. c.*

SYN.—*E. Pubescens*. Lindl. ; *E. Laniceps* Rchb. ; *Dendrob. ? Pubescens* Hook. Exot. Fl. ; *Octomeria Flava* Wall. MSS. ; *O. Pubescens* Spreng. Syst. ; C. P. 51 ?

**13. *E. Floribunda***, Lindl. in Wall. Cat. 7408 ; Bot. Reg. 1843, Misc. 43 ; 1844, t. 23, (720) ; in Journ. Linn. Soc. iii. 60.

Stem very stout, erect, terete, fleshy, leaves subterminal linear-lanceolate to elliptic, flowers small, very many in leaf-opposed or lateral decurved spikes, lateral sepals very short and obtuse, mentum deeply saccate, sidelobes of lip basal acute, separated from the small fan-shaped truncate midlobe by a strong ridge.

Malayan Peninsula ; from Tenasserim to Singapore. *Hook. f. Burma, Parish.*

*Stem* 10—18 in., as thick as the thumb or less. *Leaves* 2—5, 5—10 by  $\frac{1}{2}$ — $2\frac{1}{2}$  in., many-nerved. *Scape* short and rachis stout ; pubescent ; spike 3—6 in. ; bracts  $\frac{1}{4}$  in. broadly ovate, reflexed ; flowers  $\frac{1}{6}$  to  $\frac{1}{4}$  in. broad, white tinged with pink ; dorsal sepal small, broad, obtuse, 3—5-nerved ; petals ovate-oblong, obtuse ; column very short ; pollinia very narrow. The specimens present great differences in size, breadth of leaf, and the tip of the lip, but I am unable to find specific characters for the forms. *Hook. f. Fl. Brit. Ind. v. 792.*

Walp. Ann. vi. 276 ; C. P. 282.

**14. *E. Fragrans***, Rchb. f. in Bot. Zeit. xxii. 415.

Leaves lanceolate-acuminate, spikes long drooping pubescent, bracts lanceolate equalling the ovary, sepals  $\frac{3}{4}$ —1 in. and narrower, petals lanceolate acuminate falcate, 5-nerved, lip with 5 crenulate ridges from the base nearly to the tip, side lobes earlike, midlobe as long lanceolate.

Tenasserim ; at Moulmein, *Falconer, Parish.*

*Pseudobulb* 2—3 in., ovoid, sheathed. *Leaves* 8—12 in., variable in breadth. *Spikes* longer ; flowers very sweet, white ; side lobes of lip red ; mentum rounded, incurved ; column very short. *Hook. f. in Fl. Brit. Ind. v. 794.*

SYN.—*E. Stellata*, sp. aff. Bot. Mag. 3605, and Bot. Reg. t. 904.

**15. *E. Griffithii***, Rchb. f. Xen. Orch. ii. 163.

Leaves 2—3 shortly petioled elliptic-lanceolate, racemes erect, pubescent equalling the leaves, flowers ochreous, bracts large oblong, margins revolute, lateral sepals lanceolate acute, mentum rather long,

petals ovate-lanceolate, hypochile cuneate 3-ridged, sidelobes rounded purple, midlobe ovate acute yellow.

Tenasserim ; at Mergui, *Griffith, Parish.*

I cannot distinguish dried specimens of this from *E. bractescens*. There is an excellent drawing of it by Griffith in Herb. Lindley and by Parish at Kew.

Identified by Lindl. with *bractescens*. Griffith's specimens have ovoid rugose almost grooved pseudobulbs, 2—3 in., long, and leaves narrowed into a petiole, but in his drawing the pseudobulbs are small and leaves sessile. *Hook. f.* in Fl. Brit. Ind. v. 797.

C. P. 102 and 107.

SYN.—*E. Pulchella* Griff. Notul. iii. 297.

? Lindl. Journ. Linn. Soc. iii. p. 54.

Very near to *E. bractescens*, *Parish.*

**E. (ania) Hologlossa**, sec *Tainia Hologlossa*.

**16. E. Marginata**, Rolfe. in Gard. Chron. 1889, i. 200.

Stem clavate slender below, leaves 3 linear-oblong obtuse, scape short 2-fl. and sepals white tomentose, bracts large oblong, lateral sepals triangular lanceolate acuminate 5-nerved, petals oblong obtuse 7-nerved, mentum rounded, hypochile oblong, sidelobes uncinat much shorter than the rounded crenate pubescent epichile, disk with a tomentose ridge and tubercle at the base of the epichile.

Burma (*Hort. Bonham Carter*).

*Stem* 3 in. *Leaves* as long. *Scape*  $\frac{1}{2}$  in., bracts  $\frac{1}{2}$  in., petaloid, glabrate, yellow ; *pedicel* with ovary as long ; *flower* 1 in. diam., white flushed with pink ; *lip* pale yellow, margined with red. Described from one specimen. *Hook. f.* in Fl. Brit. Ind. v. 800.

Bot. Mag. t. 7238.

**17. E. Meirax**, N. E. Brown in Gard. Chron. 1880, 603.

Sepals glabrous 5-nerved coherent into a gibbous-based tube with free ovate acute lobes, petals broadly oblong, 5—7-nerved ciliate, lip minute ovate-cordate 5-nerved serrulate.

Tenasserim ; at Moulmein. *Parish.* Sikkim Himalaya, *Elwes.*

*Pseudobulbs*  $\frac{1}{3}$  in. diam. minutely reticulate. *Leaves* not seen in Moulmein specimens, in Sikkim 1 in., oblong-lanceolate, acute, petioled. Flowers  $\frac{1}{2}$  in. long; bracts very large, hemispheric, with a long mucro. Mr. Brown indicates the probability of *E. Elwesii* not differing from *E. Meirax*, and no distinctive characters for it are given. *Hook. f.* in Fl. Brit. Ind. v. 786—7.

SYN. *E. Elwesii*, Rchb. f. Gard. Chron. 1883, 1. 402. *Cryptochilus Meirax*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 148. Parish's description is as follows :—

"It is a dwarf species, stemless, consisting wholly of a flattened pseudobulb  $\frac{1}{2}$  in. diam. attached to the tree on which it grows by minute fibrous roots. Each bulb produces 1 sessile flower, large for the size of the bulb. Its peculiar feature is that the exterior segments of the flower cohere at their edges, and thus form a sort of tube concealing the lip. It has a 2-celled anther with 4 pollen-masses in each."

*Ageianthus Marchantioides*, Wight's Icon. 1737. C.P. 251.

18. **E. Merguensis**, Lindl. in Journ. Linn. Soc. iii. 52.

Pseudobulb clavate, spikes lateral, lip 3-lobed with a pubescent callus on each side lobe.

Tenasserim; at Mergui, *Griffith (Kew Distrib. 5120)*, *Helfer (Kew Distrib. 5381)*, *Parish, &c.*

*Pseudobulb* 2—3 in., stipitate. *Leaves* as long linear-lanceolate, obtuse or acute. *Scape* with *raceme* 2—5 in., bracts obsolete; petals elliptic, 1-nerved. *Hook. f.* Fl. Brit. Ind. v. 791.

Rchb. f. in Gard. Chron. 1880, 616; C.P. 52.

19. **E. Muscicola**, Lindl. in Journ. Linn. Soc. iii. 47. *Leaves* 2—3 petioled oblanceolate apiculate, scape and raceme longer than the leaves, flowers very small, bracts ovate or lanceolate, sepals lanceolate finely acuminate 1—3-nerved, lateral falcate, petals narrowly lanceolate 1—3-nerved, mentum rounded, lip narrow lanceolate or slightly dilated in the middle.

Tenasserim, *Parish*. Nepal, *Wallich*. Khasia Mts., alt. 3-4000 ft., *Griffith, &c.*

Very like a small state of *E. Dalzellii* (with which Rchb. is dis-

posed to unite it), but the lip is never panduriform. There may be more than one species here. In Tenasserim specimens the lip has very narrow sidelobes about the middle, and an obtuse tip. *Hook. f.* in *Fl. Brit. Ind.* v. 789.

R. fil. *Trans. Linn. Soc.* xxx. 148 ; C.P. 320.

SYN.—*Dendrob. muscicola*, Lindl. in *Wall. Cat.* 2017 ; *Gen. and Sp.* 75.

Parish gives a SYN. *D. filiforme*, Wight's *Icon.* 1642, which Hooker refers to *E. Nana*, A. Rich. in *Ann. Sc. Nat.* ser. 2, xi. 19, not a Burman species (lower right hand, fig. in Wight's *Icon.*) ; and another SYN. *E. Dalzellii*, Lindl. in *Journ. Linn. Soc.* iii. 47 (another non-Burman species) which is referred by Hooker to *D. filiforme*, Wight's *Icon.* t. 1642, (central and left hand figures). *B.G.*

## 20. *E. Myristiciformis*, Hook. *Bot. Mag.* t. 5415.

Pseudobulbs ellipsoid, leaves 2—3 oblanceolate, racemes erect and flowers glabrous, bracts lanceolate exceeding the ovary reflexed, lateral sepals ovate acute 5-nerved, petals oblong 3-nerved, mentum rounded, lip obovate with 2 long calli between the small rounded side lobes and an ovate crested midlobe, disk ridged.

Tenasserim ; at Moulmein. *Parish.*

*Pseudobulbs* of the size and form of nutmegs, striate. *Leaves* 5—7 in., acute. *Racemes* much shorter than the leaves ; pedicels with ovary 1 in. ; flowers pure white ; lip yellowish ; column very short. Specimens insufficient. Parish's *E. trilophata*, MSS., referred by Reichenbach to *E. dasypus*, is, I think, this. *Hook. f.* *Fl. Brit. Ind.* v. 797.

C. P. 113.

21. *E. Obesa*, Lindl. in *Wall. Cat.* 1976 ; *Gen. and Sp.* 68 ; in *Bot. Reg.* 1844, under t 29 ; in *Journ. Linn. Soc.* iii. 53.

Pseudobulbs 1—3 in. very stoutly clavate, silvery green and with scarious sheaths, racemes lateral subcorymbose few-fl. puberulous, bracts large, flowers  $\frac{3}{4}$  in. long, sepals lanceolate acuminate falcate 5-nerved, mentum subconic, petals oblong-lanceolate 3-nerved, lip nearly

as long as the sepals linear-oblong, sides obscurely lobed, disk with 3 thickened ridges.

Martaban, *Wallich*; Tenasserim; at Mergui, *Griffith*, *Parish*.

*Leaves* "lanceolate or ovate-lanceolate," *Griffith*. *Flowers* white, lip pale yellow with purple lines. *Capsule*  $1\frac{1}{2}$  in. long slender. *Hook. f.* in *Fl. Brit. Ind.* v. 794.

Walp. Rep. vi. 277; Bot. Mag. 5391; C. P. 24.

Pseudobulbs short, ovate, plump, 2—3 in. high, 3—4 together, their rather flattened sides touching each other. Leaves 4—5 beginning from near the base, and terminating (each) in a broad sheath, which clasps the bulb all round. These sheaths slope alternately to right and left, and are striated, or marked with lines, as are also the bulbs, which are somewhat constricted at the internodes. Flowers small,  $\frac{1}{2}$  in., almost colourless, forming a raceme of 3—4, with large ovate reflexed bracts at the junction of the stalks. *Parish*.

SYN.—*E Lindleyana*, Griff. Notul. iii. 300.

**22. E. Pannea**, Lindl. in Bot. Reg. 1842, Misc. 64. (? 79); in Journ. Linn. Soc. iii. 50.

Stems very short 1—4-leaved from a creeping rootstock, leaves linear terete fleshy, scape 1—2-fld and large ovate bracts and sepals densely woolly, sepals ovate-lanceolate obtuse, petals linear-oblong woolly, mentum rather long obtuse, lip oblong obtuse thick concave with an oblong granulate callus at the base and near the tip.

Tenasserim, *Parish*. Sikkim Himalaya, *Herb. Griffith*, alt. 1—2000 ft., *J. D. H.* Khasia Hills, alt. 3—4000 ft., *J. D. H. & T. T.* Perak, *Scortechini*, Malacca, on Mount Ophir, *Lobb*. Singapore, *Hort. Lodd*. Distrib. Borneo.

*Rhizome* as thick as a crow-quill; stems woolly, sometimes forming small globose pseudobulbs. *Leaves* 1—10 in. by  $\frac{1}{8}$ — $\frac{1}{6}$  in. diam. often pustulate. *Scape* 2—3 in.; flower sessile; lateral sepals  $\frac{1}{3}$  in. long; column very short. *Griffith's teretifolia* from Malacca, together with the Perak and Singapore plants, may be different from the Sikkim and Khasia ones, the former having narrow lanceolate and the latter broadly ovate bracts. *Hook. f.* *Fl. Brit. Ind.* v. 804.

Walp. Ann. vi. 273 ; C. P. 313.

SYN.—? *E. teretifolia*, Griff. Notul. iii. 298, t. 300, fig. 2 ; Itinerary 202, No. 1185 ; Ic. Pl. Asiat. t. 300.

**23. *E. Parishii***, Lindl. and Rchb. f. in Trans. Linn. Soc. xxx. 147.

Leaves ovate acute ciliolate, sepals free glabrous 3-nerved, dorsal large orbicular-ovate obtuse, lateral short uncinately recurved obtuse, mentum large rounded, petals lanceolate falcate 3—5-nerved, lip very small elliptic subacute at both ends.

Tenasserim ; at Moulmein, *Parish*.

*Pseudobulbs*  $\frac{1}{3}$ — $\frac{1}{2}$  in. diam. *Leaves*  $\frac{3}{4}$  in. *Flowers* minute, sepals  $\frac{1}{10}$  in. long ; pollinia, pyriform. *Hook. f.* Fl. Brit. Ind. v. 787.

C. P. 61.

**23/1. *E. Perpusilla***, see *Phreatia perpusilla*.

This plant is described twice in the Flora of British India, once under *Eria* (No. 12) and again under *Phreatia* (No. 3). *B. G.*

**24. *E. pleurothallis***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 147, tab. 30 C. ; C. P. 160.

Small, tufted, leaf solitary from a very short stem which is hidden by imbricating reticulately nerved sheaths coriaceous petioled linear-oblong or oblanceolate obtuse, scapes from sheaths on the side of the stem filiform and very small solitary flower woolly, sepals  $\frac{1}{8}$  in. long broad obtuse 3-nerved, petals narrow 1—3-nerved, lip with a broad claw orbicular, side lobes and midlobe small solid globose.

Tenasserim ; on Moolyet, alt. 5000 ft., *Parish*.

Tufted, pseudobulb 0 ; stem  $\frac{1}{8}$  in., sheaths  $\frac{1}{2}$  in., acute. *Leaves* when young ensiform, mature 2—2 $\frac{1}{2}$  in. *Scap*e much shorter ; bract under the flower small, membranous, sheathing ; mentum large, rounded ; column very short. *Hook. f.* Fl. Brit. Ind. v. 804.

**25. *E. pulchella***, Lindl. in Wall. Cat. 7407 ; in Bot. Reg. 1841, Misc. 52, (? 106) ; in Journ. Linn. Soc. iii. 51. (not of Griffith).

*Pseudobulbs* ellipsoid or clavate, leaves, 2—5 subcoriaceous, flowers



few in a stout leaf-opposed white-tomentose scape, sepals short thick spreading from the base tomentose on both surfaces, mentum O, lip small sessile entire orbicular or subcordate, disk thickened pubescent, column long stout, foot very short with a large purple shining tubercle at the base.

Tenasserim, alt. 4000 ft. *Parish*. Perak, *Scortechini*, Malacca, *Cuming*. Distrib. Siam, Java.

*Pseudobulb* 1- pluri-nodal 2—10 in. long, contracted at both ends. *Leaves* 3—5 in., sessile, obtuse or notched. *Scape* 2—3 in., base sheathed; bracts orbicular, coriaceous; flowers yellow,  $\frac{1}{2}$ — $\frac{2}{3}$  in. diam.; lateral sepals broadly ovate; petals linear-oblong, tomentose; lip with a minute claw, mobile (*Blume*). Very distinct from its congeners in the spreading flowers, lip, and foot of column; perhaps a distinct section with *E. Barbata*, which also has a mobile lip. *Hook. f.* Fl. Brit. Ind. v. 802.

I have lately received more specimens, and from Calcutta drawings of this plant, from which I conclude that Lindley was right in distinguishing *E. discolor* from *E. pulchella* though he assigns no good reasons for doing so. The chief differences are the very large stout articulate pseudobulbs of *E. discolor*, its much stouter rhizome, and stouter more glabrous scape with more numerous cochleate coriaceous bracts.

*D. Pulchella*, is a Malayan species, from Tenasserim to Java. *E. discolor* has been found only in Sikkim. Both have nearly orbicular lips articulate with the pulvinate purple shining foot of the column by a very narrow short claw. *Hook. f.* Fl. Brit. Ind. vi. 190.

Walp. Ann. vi. 271.

SYN.—*Callostylis rigida*, Blume, Bijl. 340, f. 74; Lindl. Gen. and Sp. 129.

*Tylostylis*, Blume, Fl. Jav. Præf. vi.

Parish gives his C. P. 314 for both *discolor* and *pulchella* (not of Griffith), with the note, I incline to believe *E. Pulchella* No. 277 and *E. Discolor* No. 278 of p. 51 Journ. Linn. Soc. iii. together with *Callostyles rigida*, are all one and the same.

26. **E. Pulvinata**, Lindl. in Journ. Linn. Soc. iii. 56.

Villously hirsute, stems short;  $1\frac{1}{2}$ —2 in. ovate subacute, flowers solitary hirsute, sepals ovate-lanceolate, petals linear, lip spathulate emarginate hairy and with a pubescent cushion within the tip.

Tenasserim; at Mergui, *Griffith*.

Described by Lindley from (an evidently enlarged) drawing by Griffith. Parish has a drawing of a plant named "*E. Pulvinata*" with tufted erect stems 6 in. long swollen at the base, flowers white 2-nate nearly 1 in. long, mentum truncate much shorter than the sepals. *Hook. f. Fl. Brit. Ind. v. 807*.

*Griffith*, Mergui, No. 2. Aug. 17, 1834; C. P. 274, (these references by Parish. *B. G.*).

**27. *E. Pumila***, Lindl. in Wall. Cat. 1972; Gen. and Sp. 68; in Bot. Reg. 1838, Misc. 79.

Pseudobulbs 2—3 in., subcylindric or clavate, leaves lanceolate acuminate, flowers minute subcapitate on a short lateral peduncle, sepals very broad obtuse 3-nerved, mentum rounded, petals linear acute 1-nerved, lip broadly oblong 3-nerved, side lobes long spreading lanceolate acuminate close under the small orbicular midlobe.

Tenasserim; at Moulmein, *Parish*. Khasia Hills, *Wallich*.

*Pseudobulbs*  $\frac{1}{3}$ — $\frac{1}{2}$  in. diam., tufted. *Leaves* petioled acuminate. *Spike*  $\frac{1}{2}$  in., oblong; bracts very broad, membranous; flowers  $\frac{1}{8}$  in. diam. subglobose. *Capsule*  $\frac{1}{4}$  in., pubescent. *Hook. f. Fl. Brit. Ind. v. 791—2*.

Walp. Ann. vi. 278; C. P. 234.

**28. *E. Rimanni***, Rehb. f. in Gard. Chron. 1885, ii. 712.

Pseudobulbs 3 by 1 in., pyriform, leaves 2—4 cuneate-oblong acute coriaceous light green 11-nerved, raceme dense-fl. drooping and inflorescence rusty-pilose, flowers pellucid sulphur coloured, lateral sepals triangular, mentum long obtuse, petals oblong obtuse, lip cuneate, side lobes dimidiate-oblong, midlobe transversely oblong emarginate golden with 2 purple spots, base with a tumid callus.

Burma (*Hort. Saunders*).

Probably near *E. Griffithii*, R. f. I have seen no specimens. *Hook. f.* in Fl. Brit. Ind. v. 809. (*among doubtful species*).

**29. *E. Ringens***, R. fil. in Bonplandia, v. 222.

Pseudobulb 5 in. fusiform, leaves linear-lanceolate acuminate, racemes lateral glabrous, bracts ovate much shorter than the pedicels, flowers  $\frac{1}{4}$  in., sepals lanceolate and broadly linear, petals 3-nerved, lip small ovate acute 5-nerved with an oblong thickening on each side below the middle.

Tenasserim; at Moulmein, *Parish*.

*Pseudobulb* as thick as the finger in the middle. *Leaves* 5—6 in., terminal. *Raceme* 2—2½ in., suberect. Lindl. (in Journ. Linn. Soc. iii. 55) refers this to *E. Ovata*, Bot. Reg. xxx. (1844) sub. tab. 29, of the Philippines, which has ovate obtuse leaves and a pubescent raceme. *Hook. f.* Fl. Brit. Ind. v. 793.

C. P. 324.

**30. *E. Rufinula***, Rchb. f. in Hamb. Gartenzeit xix. 13.

Hirsute, leaves 3—4 in., narrowly lanceolate very coriaceous, spikes short 2—4-flid. hispid, bracts long narrow recurved, sepals lanceolate, petals oblanceolate acute 3-nerved, lip glabrous except the ciliate base, claw broad, limb obcordate.

? Tenasserim, *Helper*. Sikkim Himalaya, alt. 5000 ft., *J. D. H. Cachar, Keenan*.

*Stem* 10—12 in., about as thick as a duck's quill. *Leaves* subfalcate, usually (in Sikkim) loaded with concretions. *Flowers*  $\frac{1}{2}$  in. long, bracts ovate-lanceolate, acuminate, falcate; mentum much shorter than the sepals; lip much thickened along the mesial line and tip; foot of column glabrous. *Hook. f.* in Fl. Brit. Ind. v. 807—8.

SYN.—*E. Annulata*, Lindl. in Journ. Linn. Soc. iii. 57. (not of Blume).

**31. *E. siccaria***, Lindl. in Journ. Linn. Soc. iii. 50.

Pseudobulbs narrowly oblong, leaves linear or linear-lanceolate semi-terete fleshy channelled, scape slender and flowers white-woolly, bracts ovate acuminate, lateral sepals ovate obtuse 5—7-nerved, petals

linear- or obovate-oblong 5-nerved, mentum obscure, lip shortly broadly clawed, sidelobes spreading rounded, midlobe obcordate, disk with a tricrural thickened ridge.

Tenasserim ; at Mergui, *Griffith, Parish.*

*Pseudobulbs*  $1\frac{1}{2}$ —2 in., long, from a stout woody rhizome. *Leaves* 4—6 in., acuminate, tapering to the base (dry pustulate). *Scape* 4—6 in. bracts  $\frac{1}{4}$  in. ; pedicel with slender ovary  $\frac{3}{4}$  in. ; flowers spreading,  $\frac{3}{4}$  in. across, white with purple markings on the lip. *Hook. f.* in Fl. Brit. Ind. v. 802.

C. P. 100,

### 32. *E. tomentosa*, Hook. f.

*Pseudobulbs* large ovoid, leaves few elliptic-oblong very thick, scape terminal very stout and raceme brown-villous, bracts very large, pedicels with the long ovary  $1-1\frac{1}{2}$  in., sepals coriaceous falcate lanceolate, mentum large incurved, petals oblanceolate, lip oblong strongly nerved, claw broad, sidelobes narrow, midlobe clawed subquadrately cordate.

Tenasserim (*loc. cit.* in *Herb. Lindl. and Parish*). Silhet, *Wallich*, Khasia Hills, alt. 3—4000 ft., and Chittagong, at Seeta Koond, *J. D. H. & T. T.* (*E. ornata*).

*Pseudobulbs* 2—4 in., from a very stout woody rhizome, 3—4-leaved when young. *Leaves* 3—6 by  $1\frac{1}{2}$ —3 in., nerveless, smooth and almost spongy, contracted into a very thick petiole. *Scape* 6—12 in., as thick as a goose-quill or less, base with short coriaceous sheaths ; rachis of raceme stout, scarred after fruiting ; bracts 1 in. and less, oblong or lanceolate, not reflexed, coarsely veined with a broad thickened roughened central area from the base to the apiculate tip.

This differs from the Philippine Island *E. ornata* in the much shorter bracts and lip. *Hook. f.* in Fl. Brit. Ind. v. 803.

SYN.—*E. ornata*, Lindl. in Journ. Linn. Soc. iii. 48 (not of Gen. and Sp. Orch.). C. P. 109 ?

*E. Flava*, Wall. Cat. 1973/2 (in part).

*Epidendrum tomentosum*, Koenig in Retz. Obs. vi. 53.

Parish gives references to *E. ornata*, Lindl. both in Journ. Linn. Soc. and Gen. and Sp. 66 ; he also gives a SYN. *E. Armenica* Bot. Reg. 1841, t. 42, which I do not find in Fl. Brit. Ind. *B. G.*

**33. *E. truncata***, Lindl. in Journ. Linn. Soc. iii. 58.

Stem subcylindric, leaves lanceolate, scape short and flowers tomentose, bracts large oblong, sepals oblong-ovate obtuse 7-nerved, mentum rounded, petals linear-oblong falcate 5 nerved, lip sessile fleshy semicircular truncate with a slender triple ridge, column rather long and broad.

Tenasserim ; on Thoung-gyun, alt. 4—5000 ft. *Lobb.* (Maulmein, *T. Lobb.* fide *Parish.*) — —

*Stem* 4—6 in., covered with obtuse sheaths. *Leaves* 3—5 in., thick, acute. *Peduncle*  $\frac{1}{2}$  in., stout, pedicel with ovary as long ; sepals  $\frac{3}{4}$  in. long, white. *Hook. f.* in Fl. Brit. Ind. v. 799.

C. P. 273.

**34. *E. Ustulata***, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 147 ; C. P. 62.

Leaves elliptic or broadly ovate subacute ciliolate, perianth 2-labiate pubescent, lateral sepals connate, mentum obscure, petals subspathulate 3—5-nerved, lip orbicular with a short tip erosely ciliate.

Tenasserim ; at Moulmein, *Parish.*

The lip is described by the authors of the species as oblong acute undulate umbonate at the base.

*Hook. f.* in Fl. Brit. Ind. v. 787.

**35. *E. Velutina***, G. Loddiges in Bot. Reg. 1840, Misc. 86. (not of Thwaites).

Stem above and leaves softly villous, leaves 2—3 in. thickly coriaceous oblong-lanceolate, flowers few in subsessile spikes, bracts ovate coriaceous, sepals ovate-lanceolate, petals linear obtuse 5-nerved lip very long-clawed, glabrous with a villous cushion on the cuneate obovate limb.

Tenasserim, *Helpfer* (*Kew distrib.* 5110). Singapore, *Cuming.* (*Hort. Lodd.*). Malacca, *Maingay.*

*Stem* 1—2 ft., as thick as a goose-quill. *Leaves* with strongly revolute margins when dry. *Spikes* dense-flid. ; mentum as long as the sepals ; side lobes of lip rounded, midlobe short, 2-flid. ; foot of column puberulous. The flowers are described in Bot. Reg. as solitary.

*Hook. f. Fl. Brit. Ind. v. 870.*

*Walp. Ann. vi. 274.*

**36. *E. Vestita.*** Lindl. in Bot. Reg. 1844, Misc. 76; 1845, t. 2.

Stems tufted, a foot or more long pendulous, about the diam. of a lead-pencil, very dry and hard near the base, where they are generally leafless, being leafy only for about  $\frac{2}{3}$  of their length; leaves lanceolate acute, 3—4 in. long, and 1 or a little more broad, fleshy, profusely covered with soft rufous hairs on both sides, making them velvety to the touch. Racemes axillary, very short, consisting of 3—4 flowers only. The short hairy stalk is rather zigzag and bears 5—6 ovate pointed bracts, the 2—3 lower of which are without flowers. Flowers sessile in the superior ones  $\frac{3}{4}$  in. long. Dorsal sepal linear, lateral sepals broad, connate below and forming a blunt spur. Petals narrow linear, about the same length as the sepals, showing their recurved tips between. Lip attached by the base of the curved spur, and curved conformably to it, undivided, wedge-shaped, rounded at the point about the length of the sepals. Column cylindrical, contained in the same line as the short ovary. Anther deep purple. Petals white, lip pale yellow. Sepals, bracts, flower, stem, and margin of lip, red with hairs.

Tavoy.

I have been minute in my description of this plant in the hope that it may be sent home and satisfactorily determined. My dried specimens appear to have been lost, and by a strange omission, the pollen-masses are wanting from my drawing of the flowers. In the absence of flowers, the plant exactly resembles "*E. Vestita*" (*sic*) of the Bot. Mag. No. 5807. In consequence of the dried and wiry character of the roots I could never succeed in making it attach itself to a tree, and it always refused to grow with me. *Parish.*

C. P. 64.

Parish's plant may perhaps differ from the *E. vestita* of the Flora of British India, which is not mentioned as a Burmese species by Hooker. His description is as follows—

Stem stout rufously hispid, leaves 5—7 in. thickly coriaceous glabrous above nerveless, spike long laxly many-fl'd., bracts large ovate, sepals lanceolate, petals linear obtuse, lip oblong shortly clawed 5—7-lamellate.

Singapore, *Wallich*. Malacca, *Maingay* (*Kew Distrib.* 1626). Perak, 4200 ft. *Curtis*.—Distrib. Borneo.

*Stem* as thick as a swan's quill. *Leaves* tomentose beneath, midrib raised, otherwise nerveless. *Spike* 6—10 in.; bracts  $\frac{1}{2}$ — $\frac{3}{4}$  in.; sepals within and petals white; mentum half as long as the sepals; side lobes of lip narrow, obtuse; midlobe transverse, crisped, emarginate; column glabrous; pollinia very slender. *Capsule* 1 in., oblong, walls very thick. Wallich's 2005 consists of detached stem, leaves and fruit of this; a good fruiting specimen of *E. ferox*, and leaves of a third species. Lindley received from him a good specimen of this, and none of *ferox*. *Hook. f.* Fl. Brit. Ind. v. 806.

Bot. Mag. t. 5807; Walp. Ann. vi. 274; Blume Mus. ii. 184.

SYN.—*Dendrob. vestitum*, Wall. Cat. 2005 (in part); Lindl. Gen. & Sp. 82.

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## KEY TO SPECIES.

### ERIA.\* *Lindley*.

Epiphytes of various habit. *Flowers* never large or bright-coloured. *Sepals* free (very rarely connate), adnate to the elongate foot of the column, and with it forming a short or long and spur-like or saccate mentum (mentum O in *E. leiophylla*). *Lip* sessile on the foot of the column and incumbent (mobile in *E. pulchella* and *barbata*). *Anther* imperfectly 4 or 8-celled; pollinia normally 8, pyriform or broadly ovoid, attached in fours by narrow bases to a viscus.

Perhaps the most polymorphous genus of Orchids, and very difficult of division into definable groups. Though never confounded with *Dendrobium* the only

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\* See Appendix A. Genus 19.

available distinctive character between these is the oblong pollinia of the latter genus, and more or less pyriform of "*Eria*". In the following descriptions of the species, I have omitted many characters of the column, anthers and pollen that are doubtless of first-rate importance, but cannot be sufficiently well detected or examined in dried specimens as to form safe sectional characters. I am unable to retain as sections *Urostachya* and *Cylindrolobus*. The monotypic sections *Xiphosium*, *Dilochiopsis*, and *Pellaianthus*, are aberrant. *E. pulchella*, Lindl. (*Callostylis*, Blume), should form a section (or genus) if the lip is, as Blume says, mobile; perhaps together with *E. barbata*, which, according to Griffith, has a tremulous lip. The thickened nerves, calli, &c., of the lip in many species are very variable in development; and considerable allowance must be made for faulty characters due to the unsatisfactory condition of complicated organs that have been dried for years, and restored by maceration or boiling.

#### Section I. PORPAX, Lindl. (Gen.).

No. 17; *E. Meirax*; No. 34; *E. ustulata*; No. 23; *E. Parishii*.

#### Section II. CONCHIDIUM, Griff. (Gen.).

No. 11; *E. Extinctoria*.

#### Section III. BRYOBIUM, Lindl. (Gen.)

No. ; 23/1 *E. perpusilla*; No. 19; *E. Muscicola*.

#### Section IV. ERIURA, Lindl.

No Burmese species.

#### Section V. MYCARANTHES, Blume (Gen.).

No. 18; *E. Merguensis*.

#### Section VI. HYMENERIA, Lindl. (and *Urostachya*, Lindl.)

\* Flowers small or minute in dense spikes, racemes, or clusters.

No. 6; *E. Convallarioides*; No. 13; *E. floribunda*. No. 27; *E. pumila*.

\*\* Flowers small or medium sized, in lax many-fl'd. spikes or racemes.

† Lip entire or nearly so.

No. 21; *E. Obesa*; No. 29; *E. Ringens*.



† † Lip 3-lobed.

§ Flowers sessile or subsessile.

No. 10; *E. Eriopsidobulbon*; No. 14; *E. Fragrans*.

§ § Flowers pedicelled.

*a* Bracts large, lanceolate or ovate-oblong.

No. 1; *E. Acervata*; No. 4; *E. Bractescens*; No. 15; *E. Grif-fithii*; No. 20; *E. Myristiciformis*.

*β* Bracts small or narrow.

No. 5; *E. Concolor*.

\* \* \* Stem erect elongate, terete, cylinderic or clavate, (broad and compressed in *E. Bifolia*), fleshy or rigid. Leaves few, usually subterminal. Flowers 1—3, medium sized, usually long-pedicelled on a short sometimes obsolete lateral or subterminal peduncle or scape with as many large spreading white often coloured bracts, sessile amongst the leaves when the peduncle is short or 0; flowers usually white. (*Cylindrolobus*; Blume, Gen.). (See also Gen. 33. *Trichosina*).

No. 3; *E. Biflora*; No. 16; *E. Marginata*; No. 33; *E. Truncata*.

#### Section VII. DENDROLIRION. Lindl.

\* *Pseudobulbs* usually large. Inflorescence white or yellowish tomentose or woolly.

No. 2; *E. Andamanica*; No. 8; *E. Dasyptus*; No. 9; *E. Elongata*; No. 12; *E. Flava*. Var. *Lanata*; No. 25; *E. Pulchella*; No. 31; *E. Sicaria*.

\* \* *Pseudobulbs* large. Flowers brown-tomentose.

No. 32; *E. Tomentosa*.

\* \* \* *Pseudobulbs* very small or 0.

No. 22; *E. Pannea*; No. 24; *E. Pleurothallis*.

#### Section VIII. BAMBUSIFOLIA, Hook. f.

No Burmese species.

#### Section IX. TRICHOTOSIA, Blume (Gen.).

\* Large more or less hirsute species. Column long.

No. 26; *E. Pulvinata*; No. 30; *E. Rufinula*; No. 35; *E. Velutina*; No. 36; *E. Vestita*.

\* \* *Small species with procumbent or creeping stems, hirsute, column very short.*

No. 7 ; *E. Dasyphylla*.

Section X. XIPHOSIUM.

No Burmese species.

Section XI. ACRIDOSTACHYA Hook. f.

No Burmese species.

Section XII. DILOCHOPSIS, Hook. f.

No Burmese species.

Section XIII. PELLATANTHUS. Hook. f.

No Burmese species.

Doubtful and Excluded species.

No. 28 ; *E. Rimanni*. (Probably near *E. Griffithii*.)

**Tainia.** *Blume.*

Terrestrial glabrous herbs ; caudex creeping, bearing a solitary elliptic-lanceolate long-petioled leaf on a slender or stout pseudobulb and with a very long scape at or near its base. *Flowers* small or middle-sized, racemose. *Sepals* narrow ; lateral falcate, adnate to and forming a mentum with the saccate base of the lip, or inserted above it. *Lip* adnate by its base only to that of the slender column, hastately 3-lobed, rarely entire, disk lamellate. *Anther* with often a simple or 2-lobed boss or 2 horns ; pollinia 4 or 8, free or united by a viscus, 4 sometimes smaller.

Very like *Chrysoglossum* which has 2 free pollinia, *Eulophia* which has a tuberous rhizome and 4 pollinia with stipes and gland, and *Plocoglottis* in which the sides of the lip are adnate to those of the column and the pollinia are stipitate in pairs on a gland. In habit, *Tainia* is totally distinct from *Eria*, as also in the long column. *Calanthes* are many-leaved, and the caudex is rarely creeping. Hook. f. in Fl. Brit. Ind. v. 819.

**37. *Tainia angustifolia*, Benth. in Gen. Plant. iii. 515.**

Leaf-blade much longer than the petiole, sepals  $\frac{3}{4}$  in. linear obtuse 3-nerved, petals broader linear-oblong obtuse 5-nerved, spur clavellate,

lip narrowly oblong, side-lobes narrow, midlobe small transversely oblong, disk with 3 ridges ending in as many lamellæ as the midlobe, anther with 2 bosses.

Tenasserim ; at Tavoy, *Wallich*.

Differs from *Ania latifolia* in the narrower leaves, larger flowers, narrower lip with the lamellæ on the midlobe, and the free globosely clavellate incurved spur of the lip ; "pollinia 8, 4 smaller." Lindl. *Hook. f.* in Fl. Brit. Ind. v. 819.

SYN.—*Ania angustifolia*, Lindl. in Wall. Cat. 3740 ; Gen. and Sp. 129.

### 38. *T. Hologlossa*, Benth. in Gen. Plant. iii. 515.

Characters of *T. latifolia* (*q. v. infra*), but lip oblong entire or lateral lobes, margin undulate, disk with 3 thickened ridges, anther low rounded smooth. *Hook. f.* in Fl. Brit. Ind. v. 822.

Tenasserim ; at Maulmein. *Parish*.

SYN.—*Eria (Ania) hologlossa*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 148 ; Wight's Icon. 914 ? ; C. P. 253.

### 39. *T. latifolia*, Benth. MSS.

Leaf-blade longer than the petiole, sepals  $\frac{1}{2}$  in. linear obtuse 3-nerved narrower than the 5-nerved petals, mentum short rounded, lip obovate-oblong, side lobes small, midlobe small orbicular or fan-shaped, disk with a narrow central and 2 broad lateral lamellæ which are evanescent on the midlobe.

Upper Burma, *Griffith*. Sylhet, Cachar and the Khasia Mts. *Wallich &c.*

Leaf 6—12 by  $2\frac{1}{2}$ — $3\frac{1}{2}$  in. Scape with the raceme 1—2 ft. ; pedicels with ovary  $\frac{1}{3}$  in. long ; midlobe of lip variable, rounded or retuse ; anther with 2 obscure bosses ; "pollinia 8 equal". Lindl. *Hook. f.* in Fl. Brit Ind. v. 820.

SYN.—*Ania latifolia*, Lindl. in Wall. Cat. 3741 ; Gen. and Sp. 130. *Eria Ania* Rchb. f. in Walp. Ann. vi. (? 70), 270. *Cymbid.* Griff. Notul. iii. 343 ; Ic. Pl. Asiat. t. 319 ; C. P. 244 and 73.

**40. T. Promensis**, Hook. f. Ic. Plant. t. 1883.

Scape tall slender, bracts long, sepals  $\frac{3}{4}$  in. oblong-lanceolate acute and elliptic obtuse petals 5—7-nerved, spur rather long obtuse, lip entire spathulate erose, disk concave with a dense granular cluster of truncate calli.

Pegu; on the Prome Hills, *Wallich*.

*Leaf* on a slender sheathed stem, blade narrow, 12 by  $1\frac{1}{4}$  in., shorter than the very slender petiole. *Scape* with 6—8-fl. lax raceme, as long as the petiole; sheaths 4—5, 2—3 in.; bracts 1 in. lanceolate, longer than the ovary. I think there are 4 flattened collateral pollinia in the only flowers I have been able to examine. *Hook. f.* in Fl. Brit. Ind. v. 820.

SYN.—*Eulophia promensis*, Lindl. in Wall. Cat. 7365; Gen. and Sp. 181; C. P. 242.

**41. T. Viridi-fusca**, Benth. in Gen. Plant. iii. 515.

Scape tall stout, bracts long, sepals 1 in. lanceolate acuminate and oblanceolate petals 5—7-nerved, spur short obtuse, lip obovate-oblong, side lobes incurved, disk with 5 lamellæ about the middle which sink to rise again on the small suborbicular midlobe as 5 truncate very thick ridges.

Tenasserim; at Moulmein, *Parish*. Assam, *Simons*.

*Pseudobulb* 2—2½ in. diam. *Leaf* 20 by 3 in.; petiole as long. *Scape* 3—5 ft.; bracts  $\frac{3}{4}$ —1 in.; exceeding the pedicel and ovary; sepals and petals green suffused with purplish brown; lip white with yellow ridges; anther hemispheric with 2 red bosses; pollinia 8, subequal. One specimen has a narrower lip with 3 narrow lamellæ irregularly enlarged on the midlobe. *Hook. f.* in Fl. Brit. Ind. v. 820.

SYN.—*Calanthe Viridi-fusca*, Hook. Bot. Mag. t. 4669; Jard. Fleur t. 336; Paxt. Fl. Gard. iii. 118, 591; C. P. 73 and 244.

## KEY TO SPECIES.

TAINIA \* Blume.

\* Spur of lip free from the base of the lateral sepals.

\* See Appendix A. Genus 26.

No. 37; *T. Angustifolia*; No. 40; *T. Promensis*; No. 41; *T. Viridi-fusca*.

\* \* Lateral sepals forming a mentum with the base of the lip.

† *Sepals and petals not produced into long tails.*

No. 39; *T. Latifolia*; No. 38; *T. Hologlossa*.

† † *Sepals and petals produced into long filiform tails.*

No Burmese species.

### ANTHOAGONIUM.\* Lindley.

A slender herb; pseudobulb small, 1—3-leaved. *Leaves* 1—3 very narrow, petioled, plaited. *Scape* from the base of the pseudobulb; flowers in a slender, simple, or branched raceme, resupinate. *Sepals* connate in a narrow gibbously-based cylinder, free tips short, of dorsal linear straight, of lateral broad revolute. *Petals* included, linear, long clawed. Lip adnate to the base of the column, long-clawed, limb flabelliform. *Column* very long and slender, lip 3-toothed; anther 2-celled; pollinia 4, ovoid, parallel, connected in pairs by a granular viscus. *Hook. f.*

1. **A. Gracile**, Lindl. in Wall. Cat. 7398 Gen. and Sp. Orchid. 426; Journ. Linn. Soc. iii. 22.

Tenasserim; at Moulmein, *Lobb.* Temperate Himalaya; Nepal, *Wallich*; Sikkim, alt. 7500 ft. *Treutler.* Khasia and Naga Hills, alt. 4—6000 ft., *Griffith, &c.*

*Pseudobulb* size of a hazel or walnut. *Leaves* 6—12 by  $\frac{1}{4}$ —1 in., on a slender stem, lanceolate. *Scape* equalling or exceeding the leaves, slender; bracts very small; pedicel with ovary  $\frac{1}{2}$ —1 in., at right angles to the perianth, both rose-cold; tube of perianth  $\frac{3}{4}$  in. long, 2—3-times as long as the free parts; limb of lip cuneate or recurved, obscurely lobed, spotted with bright red. *Capsule* 1 in., fusiform. *Hook. f.* in Fl. Brit. Ind. v. 822—3.

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\* See Appendix A, Genus 27.

SYN.—*A. Griffithii*, Rchb. f. in Bonpland. ii. 90; in Allg. Gartenzeit. 1856, 218; in Walp. Ann. vi. 471. Anthog., Griff. Notul. iii. 383; Ic. Plant. Asiat. t. 345.

I am not sure that this genus is here correctly placed. *B. G.*

### PHREATIA, \* Lindl.

Tufted, often very small plants, with the habit of *Oberonia*, pseudobulbous or not. *Leaves* distichous articulate on equitant sheaths. *Scape* axillary or lateral, or from the rootstock, slender; flowers very minute, cellular, racemed or spicate. *Sepals* equal, connivent or spreading. *Petals* smaller. *Lip* jointed on the base of the column or its foot, sessile or clawed, broad or narrow. *Column* very short, top broad, anther low, 2—4-celled; pollinia 8, obovoid, waxy, cohering by a viscus. *Capsule* minute, ovoid, terete. The flowers are of the same cellular texture as in *Thelasis*. *Hook. f.*

#### 1. *P. perpusilla*, Benth. in Gen. Pl. iii. 511.

Pseudobulbs clustered depressed, scape filiform, bracts ovate-lanceolate, sepals obtuse, lateral lanceolate, mentum obscure, lip lanceolate, margins waved.

Tenasserim; at Moulmein, *Lobb, Parish.*

*Pseudobulbs*  $\frac{1}{2}$ — $\frac{2}{3}$  in. diam. smooth. *Leaves* not seen. *Scape* 2—2½ in.; spike  $\frac{1}{2}$ — $\frac{3}{4}$  in.; bracts  $\frac{1}{8}$  in., hyaline; sepals about as long. *Hook. f.* in Fl. Brit. Ind. v. 811.

SYN.—*Eria* (*Phreatia*) *perpusilla*. Par. and Rchb. f. in Trans. Linn. Soc. xxx. 148.

Included with *Eria* in Parish's list. *B. G.*

### DENDROCHILUM,† Bl.

A small genus consisting of a few obscure plants. Pollen-masses 4, incumbent, *Parish.*

\* See Appendix A. Genus 20.

† See Appendix A. Genus 15.

Epiphytes ; rhizome creeping, scaly ; pseudobulbs narrow, 1-leaved. *Leaf* flat, narrow, coriaceous. *Scape* lateral, slender ; flowers small, in slender spikes or racemes. *Sepals* subequal, spreading ; lateral adnate to the foot of the column, *Petals* smaller. *Lip* jointed on the foot of the column, subsessile, erecto-patent, oblong, base umbonate. *Column* short, with lateral or terminal teeth or arms ; anther 2-celled ; pollinia 4, ovoid, bases cohering by a slight viscus. Hook. f.

**D. pallidiflorum** ; Blume, Bijd. 298. t. 52.

A small plant in general aspect like a *Bulbophyllum*, bearing a slender raceme about 3 in. long, of minute straw-coloured flowers from the base of the pseudobulbs.

Tenasserim ; *Parish*.

Lindl. Gen. and Sp. p. 34 ; C. P. 270 ; Fl. Brit. Ind. v. 782.

## COELOGYNE, Lindl.

(including **Pholidota**, **Otochilus**, **Pleione** and **Panisea**).

### Pholidota.

The plants of this genus have either pseudobulbs or jointed swollen stems, with plicate leaves, and terminal, 2-ranked, drooping racemes. Pollen-masses (in the only two species known to me) 4, ovate, joined in pairs to a slender caudicle. *Parish*.

1. **P. advena**, Par. and Reichb. f. in Otia Bot. Hamb. Fasc. 1. 1873, p. 47 ; C. P. 296.

Bracts semicircular, dorsal sepal elliptic obtuse strongly 5-nerved, lateral ovate, midrib very strong, petals elliptic-lanceolate acute 3-nerved, lip with very broad rounded sides, and 2 terminal lobes caruncled at their bases.

Tenasserim ; at Moulmein, *Helfer* (*Kew Distrib.* 5047) ; *Parish*.

*Pseudobulbs* stout or slender, distant on the stout rhizome. *Leaves* 1—2, elliptic-lanceolate, acuminate ; nerves very slender. *Raceme* short, decurved, peduncled ; *bracts*  $\frac{1}{3}$  in. broad ; *sepals* nearly  $\frac{1}{3}$  in. long ;

lip 5-nerved, 3 median nerves thickened at the base, caruncled towards the apex which is produced between the terminal lobes; column very broad and short; rostellum very large, 2-glandular, or tubercled at the tip; *anther* very large, long, truncate, very different from that of its congeners; pollinia as in the genus. *Hook. f.* in *Fl. Brit. Ind.* v. 846.

*SYN.*—? *Chelonanthera gibbosa*, Blume, *Lindl. Gen. and Sp.* p. 178.

**2. *P. articulata***, *Lindl.* in *Wall. Cat.* 1992; *Gen. and Sp.* 38; in *Bot. Reg.* 1839, *Misc.* 44.

Stem articulated; joints fleshy, cylindrical, 3—4 in. long, terminated by a pair of ovate leaves, from the axis of which droops a lax raceme of some dozen greenish-yellow flowers. It forms loose irregular masses, rooting freely at the joints. *Purish.*

*C. P.* 38. *Fl. Brit. Ind.* v. 844.

Not given as Burmese by Hooker. *B. G.*

**3. *P. convallariæ***, *Hook. f.*  *Ic. Pl.* t. 1880.

Leaf linear, bracts linear, raceme stout suberect, scape sheathed to the tip, dorsal sepal oblong 5-nerved, lateral ovate acuminate, midrib thick, petals broadly ovate obtuse 3-nerved, lip cymbiform nearly orbicular, broader than long 3-nerved, tip emarginate.

Khasia Hills alt. 3—4000 ft. *J. D. H. & T. T.* Naga Hills; on Kohima, alt. 4,500 ft., *Prairie*; Tenasserim; at, Moulmein, *Parish.*

*Rhizome* very stout, pseudobulbs 1—2 in., sessile by a broad base, subcylindric. *Leaves* 1—2, 5—7 in., coriaceous, obtuse. *Scape* 1—2 in. long; rachis stout; bracts  $\frac{1}{2}$  in., caducous; sepals  $\frac{1}{4}$  in. long, lip obscurely 3-lobed, warted within (normally?); column broadly ovate-tip contracted obtuse. *Hook. f.* *Fl. Brit. Ind.* v. 846—7.

*SYN.*—*Calogyne Convallariæ*, *Rchb. f.* in *Flora* 1872, 277. *C. P.* 210.

**4. *P. imbricata***, *Lindl.* in *Hook. Fl. Exot.* t. 138; in *Wall. Cat.* 1991; *Gen. and Sp.* 37 (? 36); in *Bot. Reg.* t. 1213 and 1777.

Pseudobulbs ovate, oblong, terminated by a large lanceolate leaf, from the central axis of which hangs a long flexible spike of closely



imbricated greenish-yellow flowers, each almost concealed by a concave bract, common. *Parish.*

Burma and the Andaman Islands. *Hook. f.*

Lodd. Bot. Cab. t. 1834; Wight Icon. t. 907; Dalz. and Gibs. Bomb. Fl. 262; C. P. 39; Fl. Brit. Ind. v. 845—6.

SYN—*P. pallida*, Lindl. in Bot. Reg. xxi. Sub. t. 1777.

*Cælogyne imbricata and pallida*, Rchb. f. in Walp. Ann. vi. 238.

*Ptilocnema bracteatum*, Don Prodr. 33.

*Cymbidium imbricatum*, Roxb. Fl. Ind. iii. 460.

*Ornithidium imbricatum*, Wall. MSS.—Rheede Hort. Mal. xii. t. 47.

### 5. *P. Lugardii*, Rolf.

This species is allied to *P. articulata*, Lindl., but is altogether a more robust plant, more erect in habit, and larger in all its parts. The sepals and petals are semi-pellucid white, and the sac of the lip pale flesh-cold., the keels unequal, and buff-cold. It flowered in the collection of John Kirk, of Wanestree, Sevenoaks, in June 1890, when he forwarded it to Kew for identification, together with a living plant, which has since flowered. It is one of a large collection made by Capt. Lugard.

Western Burma, Chin Hills, at 6,000 to 8,000 ft. *elv. Lugard.*

*Kew Bulletin No. 73, 1893.*

### 6. *P. rubra*, Lindl. Gen. and Sp. Orchid. 37.

Leaves elliptic-lanceolate, raceme decurved, bracts acute, sepals ovate acute 3—5-nerved, petals narrowly linear 1-nerved, lip slightly 3-lobed, side lobes broad rounded, midlobe broadly ovate acute, nerves 5, thickened at the base.

Subtropical Himalaya; Sikkim, alt. 4—6000 ft. *Hook. f.* Khasia Hills, alt. 4—5000 ft., *Wallich &c.* Upper Burma; *Griffith (Kew Distrib. 5387.)*

*Pseudobulbs* 2—3 in., on a stout rhizome, narrowed below. *Leaves* 1—2, 4—10 in., 5-nerved. *Scape* when flowering short and sheathed to the top, at length 6—10 in., and naked; *raceme* 4—8 in., flexuous, drooping, lax fld.; *bracts*  $\frac{1}{3}$ — $\frac{1}{2}$  in., spreading and deflexed; *sepals*  $\frac{1}{4}$  in. long, midrib thick; *column* with narrower wings than in its allies, clinandrium transversely oblong. *Capsule*  $\frac{2}{3}$  in. *Hook. f.* Fl. Brit. Ind. v. 847

Wall. Pl. As. Rar. iii. 21, t. 239; Hook. f. Ic. Plant. t. 1879.

SYN.—*P. undulata*, Lindl. in Bot. Reg. Sub. t. 1213, and xxvii. Misc. 6.

*Cælogyne rubra* and *undulata*, Walp. Ann. vi. 238.

## KEY TO SPECIES.

### PHOLIDOTA \* Lindl.

Perennial herbs with the habit of *Otochilus*, or with sessile 2-leaved pseudobulbs. *Scape* or rachis of raceme often flexuous; bracts distichous, rigid; flowers small, globose. *Sepals* concave. *Petals* flat, broad or narrow. *Lip* sessile on the base of the column, erect, saccate, subentire or 3--4 lobed. *Column* very short, hooded or winged; anther-cells subglobose, rarely elongate; pollinia 4, subglobose, free or cohering in pairs by a viscus.

\* *Stems* elongate, branched, formed of pseudobulbous internodes. *Scape* from the top of the pseudobulb between the leaves.

No. 2; *P. articulata*; No. 5. *P. Lugardii*

\*\* *Rhizome* elongate; internodes terete, clothed with membranous sheaths and bearing slender 1—2-leaved pseudobulbs at the nodes. *Scape* from the sheaths of the internodes.

No Burmese Species.

\*\*\* Pseudobulbs uninodal, seated on a very stout creeping rhizome. *Scape* from the top of the pseudobulb.

† *Bracts* very broad. *Lip* with 2 free or connate terminal lobes. No. 1, *P. advena*. No. 4, *P. imbricata*.

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\* See Appendix A. Genus 36.

† † *Bracts narrow. Lip with a simple narrow terminal lobe or O.*  
No. 3, *P. Convallariae*. No. 6, *P. rubra*.

### Otochilus Lindl.

In general appearance like *Pholidota imbricata*, but the flowers are slenderer, and have a long arched half rounded column resembling that of *Cælogyne*. Pollen-masses 4, incumbent, concavo-convex, united in pairs by an elastic cobwebby material. Forming large tangled masses on the branches of trees in mountainous districts. Flowers colourless and inconspicuous. *Parish*.

#### 7. *O. fusca*, Lindl. in Wall. Cat. 1969. Gen. and Sp. 35.

Sepals and petals obtuse, side lobes of lip reduced to small teeth, midlobe linear oblong.

Burmese according to Parish, not so given by Hooker. *B. G.*

*Pseudobulbs* 1—2 in., cylindric, fusiform or clavate, *Leaves* 2—5 in., linear-lanceolate, shortly petioled. *Racemes* short or long; *bracts*  $\frac{1}{3}$  in. subtruncate; flowers pale pink; sepals  $\frac{1}{3}$  in., linear-oblong; petals narrower, dilated upwards; lip concave; column red; pollinia subglobose. *Capsule*  $\frac{1}{2}$  in. The name is inappropriate. *Hook. f.* in Fl. Brit. Ind. v. 844.

Bot. Mag. t. 3921. C. P. 342.

SYN.—*O. lancifolia*, Griff. Notul. iii. 278; Ic. Pl. Asiat. t. 289; *Cælogyne fusca*, Rchb. f. in Walp. Ann. vi. 236 *Broughtonia? fusca*, Wall. MSS.

#### 8. *O. porrecta*, Lindl. in Wall. Cat. 1968; Gen. and Sp. 36.

Sepals acuminate, side lobes of lip falcate obtuse midlobe lanceolate.

Tenasserim, alt. 5000 ft., *Parish*.

*Pseudobulbs* 2—4 in., subcylindric or clavate. *Leaves* 5—10 by  $1\frac{1}{2}$  —  $2\frac{1}{2}$  in., elliptic-lanceolate, rather long-petioled. *Racemes* decurved; *bracts* broad, acute, caducous; flowers white or pale flesh-colored; sepals  $\frac{1}{3}$  —  $\frac{2}{3}$  in., linear; petals linear; lip with larger side lobes than in *O. fusca*; pollinia globose. *Capsule*  $\frac{3}{4}$ —1 in. *Hook. f.* Fl. Brit. Ind. v. 844.

C. P. 209.

SYN.— *O. latifolia*, Griff. Notul. iii. 279 ; Ic. Plant. Asiat. t. 289. *Cælogyne porrecta*, Rchb. f. in Walp. Ann. vi. 236. *Tetrapeltis fragrans*, Wall. MSS.

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## KEY TO SPECIES.

## OTOCHILUS,\* Lindl.

*Stem* articulate, branched, formed of superposed elongate pseudo-bulbous internodes. *Leaves* in pairs at the nodes, elliptic or lanceolate, plaited. *Scape* subterminal on the internodes, slender, bases sheathed flowers small, racemose ; bracts scarious, sides convolute. *Sepals* and *petals* sub-equal, free, narrow, spreading. *Lip* sessile at the base of the column, base saccate, side lobes erect, midlobe narrow, entire. *Column* very long slender, erect, foot O ; anther-cells distinct, subglobose ; pollinia 4, ovoid or subglobose, cohering in pairs or all together by a viscus.

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## Pleione, Don.

A genus of dwarf deciduous plants, with flask-like bulbs, and light-green membranous leaves which are produced after the decay of the flowers. By some they are regarded as a section of the genus *Cælogyne*, from which they differ but slightly, except in habit, but their habit is so peculiar that they seem to be entitled to generic rank. After finishing their growth, the leaves begin to die away ; this is the season of rest during which they should be given very little water. After the rest the flowers are produced, *i. e.* in the autumn months, immediately preceeding the young growths. The flowers are solitary, produced on sheathed peduncles which spring from the root ; and they have a fringed lip, saccate at the base. They should be potted, and after the pseudobulbs are fully formed give only enough water to prevent shrivelling : but when they begin to show flower, water freely, which will induce the flowers to become finer. *Williams.*

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\* See Appendix A. Genus 35.

A small group of very distinct form and habit by some united with *Cœlogyne*, and indeed in the general structure of their flowers having no essential difference; passing moreover by easy gradations, through *C. Schilleriana* and *C. uniflora* into that genus. The few plants belonging to this group are dwarf epiphytes growing in dense patches on rocks and trees on the higher mountains, among moss. They consist of rounded more or less depressed, pseudobulbs  $\frac{3}{4}$ —1 in. in diam. and height from the base of which spring 1—2 strikingly beautiful flowers of extraordinary size for that of the bulbs. Leafless when in flower. Although apparently lateral, the flowers (as in *Cœlogyne*) are really terminal. They grow at the end of a new and as yet undeveloped pseudobulb, which, in its early stage, forms the footstalk of the flower. This, after the flower has perished, swells, and eventually becomes the recognized pseudobulb, often bearing at its end the now matured fruit. Thus the leaves are formed later than the flower, the reverse of what is ordinarily the case in Orchids. *Parish.*

#### 9. *Pleione præcox*, Don Prodr. 37.

A most distinct and beautiful species of dwarf habit, with pale mottled brownish purple turbinate pseudobulbs covered with a strong veining of loose network and surmounted by a solitary broadly lanceolate membranous plaited leaf, which decays before the appearance of the scape.

The latter springs from the side of the pseudobulb, and bears one showy flower, which is fully 3 inches across, and saccate at the base; the lanceolate sepals and smaller petals are deep rose-colour, and the lip, which is prominent and 2 in. long, is blush-white, beautifully fringed-toothed, and the disk yellow furnished with 5 toothed keels or crests reaching nearly to the apex, and a few yellow and rose-col. spots. Flowers in Nov. and Dec. *Williams.*

Pseudobulbs ampulliform or turbinate at length umbonate, leaf-sheaths tubercled, bracts equalling or exceeding the ovary, flowers rose-purple, lip subrepand lacinate in front, disk with 3—5 crested lamellæ, top of column 4-toothed.

*Pseudobulbs* very variable, 1—1½ in. broad and long, at first de-

pressed bottle-shaped, at length shortly cylindric with a depressed top conic in the middle covered with reticulate filaments, usually dark-green often blotched with red or purple. *Leaves* 1—2, 2—9 in. elliptic or lanceolate, acute; *scape* 3—4 in.; *bracts* sheathing obtuse; *flowers* 2½—4 in. diam., sweet-scented; *sepals* and *petals* narrow, recurved, acute; *lip* 2-fid. deeply fimbriate in the Pegu and Tenasserim specimens. *Capsule* ¾—1 in., fusiform. *Hook. f.* Fl. Brit. Ind. v. 840.

Abundant in the mountains near Toungoo at 7—8000 ft. elv.; Tenasserim, summit of Nat-toung, *Parish*. Temperate Himalaya, alt. 5—8000 ft. from Garwhal eastwards. Khasia Mts., alt. 4—6000 ft. *Hook. f.* Pegu, *Kurz*. N. India: Khasia at 4700 ft., Nepal at 7500 ft., and Sikkim at 5800 ft., elv. *Williams*.

SYN.—*Cælogyne Præcox*, Lindl. Coll. Bot. 37; in Wall. Cat. 1965; Gen. and Sp. 43; Fol. Orchid. 16; Hook. f. l. c.; Bot. Mag. t. 4496; Paxt. Mag. xiv. t. 7; Trans. Hort. Russ. Soc. 1880, t. 69 (Var.)

*Epidendrum præcox*, Smith Exot. Fl. t. 97.

*C. Wallichiana*, Lindl. Gen. and Sp. 43, in Wall. Pl. As. Rar. i. 46, t. 54; Bot. Reg. xxvi. t. 24; Paxt. Mag. vi. t. 25; Gartenfl. t. 283; Jennings Orchid. t. 472, f. 2; Griff. Notul. iii. 402.

*C. Wallichiana* is not even a variety, and Var. *sanguinea* is only characterized by the decaying leaf. *Hook. f.*

*Pleione Wallichiana*, Jard. Fleur. t. 153.

*P. Wallichii*, Lindl. in Paxt. Fl. Gard. sub. t. 51.

*Cymbidium præcox*, Smith in Rees. Cyclop.

Var. *Birmanica*. Rehb. f. in. Gard. Chron. 1882, ii. 840.

Said to produce generally 2-fid. penduncles. *Williams*.

Doubtfully described as a species by Reichenbach (*Cælogyne birmanica*), distinguished by the bluish-purple pseudobulbs with many white circles and an entire border of the hood of the column. Veitch (Man. Orchid. Pl. vi. 58) distinguishes his Var. *Wallichiana* by its deeper colour, more strongly-marked veins, the midlobe of the lip toothed rather than fringed, and the shorter teeth of the crests; he includes *C. birmanica* under it, and gives a figure of the flower. *Hook. f.*

**10. P. Reichenbachiana.**

A very distinct and beautiful species. The large pitcher-shaped pseudobulbs, which are constricted below the middle, are longitudinally 6—8-lobed; the lobes which form the rounded prominences at the widest part are of a very dark green, reticulated with brown lines; and by their side appear the scapes, each bearing 1—2 large flowers, of which the narrow oblong sepals are rosy-lilac, with paler edges, the narrower petals are paler with a bar of rosy-lilac down the centre, and the lip is white, the dilated front lobe ciliato-dentate, bifid, the disk bearing three keels which are crested with papillose teeth, short lines of rosy-crimson intervening between the veins in front, and a few spots of the same colour being scattered over the surface. A very rare species. —Moulmein. *Williams*.

Arracan; at Rangoon, *Benson (Hort. Veitch)*. Found on the Mts. East of Moulmein at a somewhat lower elvn. than *P. præcox*. *Parish*. C. P. 72.

SYN.—*Cælogyne Reichenbachiana*, T. Moore in Gard. Chron. 1868, 1210; Hook. f. in Bot. Mag. 5753: in Fl. Brit. Ind. v. 841.

Veitch gives 6—7000 ft. as the elevation at which this species was found.

**P. Schilleriana**, see *Cælogyne Schilleriana*.

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#### KEY TO SPECIES.

Note. PLEIONE forms Sect. II. of *Cælogyne* in Hooker's Flora of British India. See Appendix A, Genus 34. *B. G.*

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#### CÆLOGYNE, Lindley.

A numerous genus. They are pseudobulbous and evergreen plants, the bulbs from 1—6 in. high, 2-leaved, the flowers being generally produced with the young growth, and the leaves being perfected when the flowering is over. The lip is sessile, the base concave and folded over the elongated apodous column. They do best grown in pots or baskets, some will do on blocks, and they require good drainage and

abundance of water at their roots in the growing season. During the season of rest they should have but little water. They are propagated by dividing the pseudobulbs. *Williams.*

The Orchids of this genus have for the most part handsome flowers, though not of the first order of beauty. They are to be distinguished by the following characters. The flowers are terminal on a pseudobulb formed or unformed. Pseudobulbs crowded so as to form tufts, or distant on a creeping rhizome, generally short, but sometimes much elongated.

Leaves 2, at the end of the pseudobulb. Sepals separate and distinct, generally, but not always, wide-spread; petals similar but narrower. Lip large, articulated with the base of the column and parallel with it, usually 3-lobed, the side lobes very large and erect, with longitudinal raised lines or crests on the disk. One of the most marked characters is the column which is long, curved and winged, often horned and toothed at the top. Pollen-masses 4 incumbent, united in pairs by a granular substance. This is the rule but there are exceptions. *Parish.*

Note. *Calogyne* forms Sect. I., Eucœlogyne, of Hooker in Fl. Brit. Ind.

**C. apiculata**, Par. and Rchb. f. in Walp. Ann. xvii. 225; C. P. 214. See *Panisea apiculata*.

**11. C. Barbata**, Griff. Itin. Notes, 721; Notul. iii. 280; Ic. Pl. Asiat. t. 191, f. 2.

This is a most useful winter-flowering species and according to Dr. Lindley, the finest of its genus. The pseudobulbs are roundish-ovate, light green, with leaves of a thick leathery texture and oblong-lanceolate form, produced 2 from each bulb. The flower-scapes are erect, producing a flexuous raceme of several flowers, which open in succession, the individual blossoms being from 2—3 in. across. The sepals and petals are pure white, distinctly bearded round the margin with a fringe of sepia-coloured hairs, and of a darker sepia brown in the centre, where they cover the veins, and form 3 shaggy crests. Requires an abundant supply of moisture. *Williams.*



Pseudobulb large ovoid, leaves very large petioled elliptic-lanceolate, scape and rachis very stout, flowers large white, sepals ovate-oblong acute, petals linear 3—5-nerved, lip broad, side lobes rounded white, and small ovate purple midlobe deeply fimbriate, disk with 3 fimbriate ridges.

*Pseudobulbs* 3—4 in.; rhizome very stout. *Leaves* 6—12 in.; petiole 3—4 in. *Scape* as long as the leaves; sheaths  $\frac{3}{4}$  in., and less; sepals  $1\frac{1}{2}$  in.; lip very saccate at the base. *Hook. f.* Fl. Brit. Ind. v. 839.

Bhotan? *Griffith.* Khasia Mts., alt. 4—5000 ft., *Griffith, &c.* Naga and Munnipore Hills, alt. 5000 ft., *Prain, Watt.* Burma, *Rangoon Agric. Hortic. Society's Collectors (rare).*

Not given as Burmese by Hooker. *B. G.*

Warner Orchid Alb. iii. t. 143; Lindl. Fol. Orchid. 9; Masters in Gard. Chron. 1886, 117, fig. 23 (frnt.); Rchb. f. in Gard. Chron. 1880, i. 8; Veitch Man. Orchid. Pt. vi. 32, with fig.; Walp. Ann. vi. 229; Orchidoph. 2888, p. 154.

## 12. *C. brachyptera*, Rchb. f. in Gard. Chron. 1881, ii. 6.

Pseudobulb a span high tetragonous, leaves not seen, raceme several-fl'd. bracts equalling the ovary persistent, sepals triangular-ligulate acute light parrot-green, lateral keeled in the middle, petals filiform, lip white with a brown stain, side lobes semi-ovate short triangular in front, midlobe oblong acute undulate, keels 3 all warded in front, column hooded and retuse at the top, hood crenulate. Flowers like *C. lenticginosa*. (Possibly *C. Parishiana*. J. D. H.). *Hook. f.* Fl. Brit. Ind. v. 842.

## 13. *C. corrugata*, Wight Ic. t. 1639.

A free-growing compact plant from the hilly districts of India, with ovate wrinkled pseudobulbs bearing a pair of broad oblong leaves and producing erect racemes of lovely pure white flowers of considerable size: the lip is yellow inside striped with orange. It should be grown in a pot, with an abundance of drainage. *Williams.*

Pseudobulbs ovoid, leaves elliptic coriaceous, raceme 2—3-fl'd., bracts large, sepals and subequal petals oblong-lanceolate acuminate

white, lip white and yellowish, side lobes short, midlobe ovate obtuse, disk with 3 crenulate ridges.

*Pseudobulbs* 1—2½ in. long, tufted, ribbed and rugose when dry; sheaths broad, acute. *Leaves* 3—5 in. *Scape* with broad basal sheaths and 2 undeveloped leaves; *bracts* 1½ in., acute, caducous; *sepals* 1¼—1½ in. *Capsule* 1—1½ in., fusiform or pyriform; ribs prominent. Lindley keeps up both *corrugata* and *nervosa*, but I find no difference between authentic specimens of each. *Hook. f. Fl. Brit. Ind. v. 835.*

Burma, *Rangoon Agri-Hortic. Society's Collectors*: Nilghiri and Travancore Hills, *Wight, Perrottet, &c.*

Not given as Burmese by Hooker.

*Bot. Mag. t. 5601*; *Batem, 2nd. Cent. Orchid. Pl. t. 188*; *Lindl. Fol. Orchid. 6.*; *Walp. Ann. vi. 227.*

*SYN.—C. nervosa*, A. Rich. in *Ann. Sc. Nat. Ser. 2, xv. 16*: *Lindl. l. c.*; *Walp. l. c. (not of Wight).*

**14. *C. cynoches*, Par. & Rchb. f. in Trans. Linn. Soc. xxx. 147.**

*Pseudobulbs* narrow, leaves sessile elliptic, raceme drooping 6—8 fld., bracts persistent, flowers greenish and brown, sepals oblong-lanceolate acuminate, petals narrowly linear 3-nerved, side lobes of lip short, midlobe orbicular apiculate or broadly ovate, disk with 5 slender ridges.

Tenasserim; on Dauna-toung, alt. 4000 ft. *Parish.*

Very like *C. fuscascens*, but much smaller; *pseudobulbs* 1½—2 in., leaves 4—5 in., scape with 2 leaves emerging from the sheaths, flowers smaller (than 1½—2 in. diam.), sepals 1¼ in., and side lobes of lip barred with red-brown. *Hook. f. Fl. Brit. Ind. v. 834.*

*C. P. 195.*

**15. *C. elata*, Lindl. in Wall. Cat. 1959; Gen. & Sp. 40; in Wall. Pl. As. Rar. iii. 12, t. 218; in Bot. Reg. 1839, Misc. 92; Fol. Orchid. 9.**

*Pseudobulbs* very large oblong, leaves very long-petioled lanceolate, scape shorter stout, raceme short, flowers subsecund, sepals oblong-lanceolate creamcol., petals linear, lip white with yellow blotches, side lobes narrow erose, midlobe rounded-ovate acute erose, disk between the side lobes with 2 tortuous crenulate lamellæ.

Upper Burma, *J. Anderson.*

*Pseudobulbs* 3—5 by 1—2 in., narrowed upwards or not; *sheaths* very large, acute; *rhizome* as thick as the little finger. *Leaves* 5—12 by  $1\frac{1}{2}$ —3 in.; *petiole* 2—4 in.; *Scape* 10 in. and under; *sheaths* large; *flowers* 1— $1\frac{1}{2}$  in. diam. ("smell unpleasant," Lindl.); *lamellæ* of disk of lip sometimes tipped with red. *Hook. f. Fl. Brit. Ind. v. 838.*

*Bot. Mag. t. 5001; Walp. Ann. vi. 230.*

*SYN.—Cælogyne, Griffith, Ic. Pl. Asiat. t. 290.*

This is said to inhabit higher regions than the tropical, up to 9000 ft. *Veitch Man. Orchid. Pt. vi. 37.*

**16. *C. fimbriata*, Lindl. in Bot. Reg. t. 868, 1838, Misc. 92; Fol. Orchid. 12.**

*Pseudobulbs* small ovoid-oblong distant on a slender rhizome, *scape* 1-fl., shorter than the lanceolate leaves, *sepals* ovate-lanceolate, yellow-green or brownish, *petals* filiform, *lip* yellow streaked with red-brown, *midlobe* orbicular fimbriate, *disk* 2-lamellate.

Khasia Mts., alt. 4000 ft., *Griffith, &c.*—Distrib. China.

*Pseudobulbs*  $\frac{3}{4}$ — $1\frac{1}{2}$  in.; *rhizome* as slender as a duck's quill. *Leaves* 2—5 in., sessile. *Scape* 1—2 in.; *basal sheaths* few, appressed; *bracts* deciduous; *sepals*  $\frac{3}{4}$  in., acuminate; *petals* 1-nerved; *side lobes* of lip with fimbriate tips. *Hook. f. Fl. Brit. Ind. v. 836.*

*Lodd. Bot. Cab. t. 1425; Walp. Ann. vi. 231; Benth. Fl. Honk. 354.* This species is not given as Burmese by Hooker, but is given by Parish in his list with reference, *Griff. Icon. Pl. As. 291, No. 1*, which is given by Hooker for *C. ovalis*, which he says is "very near indeed to *C. fimbriata* differing in the much longer ascending rhizome, narrower 2—3 in. pseudobulbs, and usually larger flowers; but it varies much in all these respects, as also in the breadth of the sepals and length of lamellæ on the lip. Capsule in., turgidly pyriform." This is possibly Parish's *fimbriata*, *C. P. 118*; but he also gives the species *C. ovalis*, with references to Lindl. *Bot. Reg. 1838, Misc. 171; C. P. 243.* Neither *fimbriata* nor *ovalis* is given as Burmese by Hooker. Perhaps it is *fuliginosa*? *B. G.*

**17. *C. flaccida*, Lindl. in Wall. Cat. 1961; Gen. and Sp. 39; in Bot. Reg. 1841, t. 31; Fol. Orchid. 2.**

Pseudobulbs elongate, leaves long-petioled, sepals  $\frac{3}{4}$  in. linear-oblong acute, petals narrower acuminate side lobes of lip large rounded, midlobe small broadly ovate, disk with 3 yellow flexuous ridges.

Tenasserim; on rocks of Jook Long, *lc. Parish*.

*Pseudobulbs* 2—6 in., sheaths large, coriaceous, purple-brown. *Leaves* 6—12 in., linear-lanceolate, acuminate; petiole 1—3 in. *Scape* with short broad obtuse basal sheaths; raceme 4—5 in., pendulous; bracts  $\frac{1}{2}$ — $\frac{3}{4}$  in., caducous; flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. diam., white (said to smell offensively), side lobes of lip brown. *Capsule*  $2\frac{1}{2}$  in., clavate, broadly winged. *Hook. f.* Fl. Brit. Ind. v. 829.

Bot. Mag. t. 3318; Walp. Ann. vi. 222; C. P. 143.

**18. *C. fuliginosa*, Lindl. in Lodd. Cat.; Fol. Orchid. 12.**

Habit and characters of *C. ovalis*, but raceme 3—4-fl. flowers orange yellow, lip dark brown, lamellæ ending abruptly.

Tenasserim; at Moulmein, *Parish*.

As flowered at Kew this differs from *ovalis* in the characters indicated. *Hook. f.* Fl. Brit. Ind. v. 836.

Lindl. Fol. Orchid. 12 (excl. the Khasia plant); Bot. Mag. t. 4440; Jard. Fleur. t. 7; Miquel Choix, t. 25 (1-fl. Var.)

SYN.—? *C. triplicatula*, Rchb. f. in Bot. Zeit. 1864, 415; Xen. Orchid. ii. 159, t. 166.

**19. *C. fuscensens*, Lindl. in Wall. Cat. 1962/1; Gen. & Sp. 41 Fol. Orchid. 11.**

The pseudobulbs are elongate, terete, 3—4 in. long, the broad oblong plicate leaves in pairs, and the flowers in short nodding 5—8-fl. racemes. The sepals and petals are brownish-green, the dorsal sepal broadest, and the lip marked with 4 cinnamon spots, one on each side of the small lateral lobes, and 2 at the base of the midlobe, where there are also 3 elevated lines or crests. It flowers in autumn and winter, and lasts a considerable time in bloom. *Williams*.

Pseudobulbs long narrow, leaves petioled elliptic, raceme 3—8-fl., bracts deciduous, sepals oblong acute and very narrow 1—3-nerved, petals yellow greenish or pink, lip mottled with brown, side lobes

elongate free ends small obtuse, midlobe clawed large orbicular or quadrate, disk with 3 smooth ridges.

*Pseudobulbs* 4—6 in., subcylindrical, grooved ; sheaths short ; rhizome very stout. *Leaves* 6—10 by 3—4 in., many-nerved. *Scape* with raceme 4—8 in., suberect or drooping ; flowers 1½—2 in. diam., very variable in colouring. *Capsule* 2 in., pyriform, angles winged. *Hook. f. Fl. Brit. Ind. v. 833.*

Tropical Himalaya, alt. 3—5000 ft., from Nepal eastwards, and the Khasia Mts. *Hook. f. Burma, Moulmein, Williams.*

Walp. Ann. vi. 231.

SYN.—*C. Assamica*, Lindl. ex Rchb. f. in Koch Allgemein. Gartenzeit 1857, 503 ; Xen. Orchid. ii. t. 134.

Var. *brunnea*, Lindl.

Sepals and petals lanceolate acuminate, straw-yellow, sepals wider than the petals ; lip 3-lobed, lateral lobes speckled and margined internally with brown, midlobe nearly square, whitish at the edges passing into rich chestnut brown at the base. *Williams.*

A plant of much the same character as *C. rigida*, but generally smaller and less robust. The flowers are 5 or 6 in a drooping raceme at the end of the young undeveloped pseudobulbs each about 2 in. long, of a general tawny yellow colour. The lip dark chocolate-brown. A handsome Orchid. *Parish.*

In Var. *brunnea* the sinus between the mid- and side-lobes is almost obsolete. Wall. Cat. 1961/2 is *C. macrobulbon*. *Hook. f.*

Bot. Mag. 5494 ; Batem. 2nd. Cent. Orchid. Pl. t. 104 ; Lindl. Fol. Orchid. C. P. 161.

SYN.—*C. brunnea*, Lindl. in Gard. Chron. 1848, 71, with fig.

Burma, *Parish*. Moulmein, *Williams*.

Not given as Burmese by Hooker. *B. G.*

**20. *C. graminifolia***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 146.

Pseudobulbs ovoid, leaves very narrow, raceme 3—4-fl'd., sepals and much narrower petals oblong-lanceolate acute white, lip orange

yellow side lobes rounded, midlobe smaller broadly ovate acute, disk with 3 dark brown or red crisped ridges.

Assam, *Mann*; Tenasserim; Mts. near Moulmein, *Parish*.

*Pseudobulbs*  $1\frac{1}{2}$ — $2\frac{1}{2}$  in., crowded; sheaths short. *Leaves* 10—12 by  $\frac{1}{3}$ — $\frac{1}{2}$  in. *Scape* much shorter, sheathed to the middle or lower; *bracts* caducous; *sepals* 1 in. *Hook. f. Fl. Brit. Ind. v. 831—2.*

C. P. 252; Bot. Mag. t. 7006; Rolf in Gard. Chron. 1888, i. 168.

## 21. *C. Huttneriana*, Rchb. f. in Flora 1872, 277.

*Pseudobulbs* fusiform very rugose, leaves petioled oblong-lanceolate, bracts acuminate, sepals ovate-lanceolate acuminate, petals linear, side lobes of lip rounded, disk with 3 crisped ridges extended into the rounded ovate acuminate midlobe.

Tenasserim; at Moulmein, *Parish*.

*Scape*, in the only specimen seen, 7 in.; *sheaths* closely imbricating, the outer purple-brown; *raceme* 8—10-fl., drooping; *bracts* 1 in., cymbiform. I have seen no pseudobulbs or leaves; the flower is described from a specimen named by Reichenbach, who says "flowers white and lip toothed with a ligulate midlobe. *Hook. f. in Fl. Brit. Ind. v. 830.*

## 22. *C. lactea*, Rchb. f in Gard. Chron. 1888, i. 521.

*Pseudobulb* short thick fusiform, leaves very thick petioled cuneate oblong acuminate, raceme porrect 6—8-fl., bracts deciduous, flowers cream-white, sepals oblong obtusely acute, petals linear-lanceolate, side lobes of lip obtuse, midlobe porrect, disk with 3 crenulate keels from the base between the side lobes, top of column 2—3-fl.

Burma. (*Hort. Lendy.*)

Perhaps *C. Lutae*, Parish MSS., of which the specimens are very imperfect. *Hook. f. Fl. Brit. Ind. v. 843.*

*Pseudobulbs* oblong tapering, deeply furrowed, 3—4 in. long. *Leaves* in pairs, 6—8 in. long by 2 in. wide, coriaceous, deep green.

*Raceme* springing from the base of the bulbs, nodding, 6—12-fl. Individual flowers 2 in. across. *Sepals* broadly oblong acute, creamy-white. *Petals* much smaller, linear-oblong, same colour with brown.

Midlobe yellow at the base, but devoid of scent. Flowers in spring. Burma, *Williams*.

Orchid Album, x. t. 459.

**23. *C. lentiginosa*, Lindl. Fol. Orchid. 3.**

Pseudobulbs linear oblong, leaves shortly petioled elliptic lanceolate, raceme 5—8-flid., sepals oblong-lanceolate acute and rather narrower petals pale green, side lobes of lip oblong obtuse, margins brown, midlobe large shortly broadly clawed nearly semicircular crenate white with orange blotches, disk with 3 obscure short crenate ridges.

Tenasserim; at Moulmein, *Lobb, Parish*.

*Pseudobulbs* 3—4 in., obtusely 4-angled. *Leaves* 6—8 in. *Scape* with erect raceme 4—5 in., sheathed up to the flowers; *bracts*  $\frac{1}{2}$ — $\frac{2}{3}$  lanceolate, persistent; *flowers*  $1\frac{1}{2}$  in. diam.; ridges of lip not produced on to the midlobe, side lobes speckled with brown. *Hook. f. Fl. Brit. Ind. v. 131.*

Bot. Mag. t. 5958; Rchb. f. in Trans Linn. Soc. xxx, 146; Walp. Ann. vi. 224; C. P. 189.

SYN.—*C. fuliginosa*, Lindl. Fol. Orchid. p. 3.

**24. *C. Maculata*, Lindl. Gen. and Sp. 43.; in Wall. Pl. As. Rar. i. 45, t. 33; Fol. Orchid. 15.**

Pseudobulbs stout umbonate with a conical top, sheaths of scape bullate, bracts large inflated truncate, flowers white, sepals oblong-lanceolate, petals oblanceolate, lip rounded quite entire blotched with dark purple, disk yellow and red with 5—7 pectinate ridges.

Nepal, *Wallich*. Sikkim and Bhotan, alt. 3500—4000 ft., *Clarke, &c.* Khasia Hills, alt. 4—5000 ft. *Wallich, &c.*

Non-Burman.

*Pseudobulbs* barrel-shaped, with a depressed top rising into a blunt cone, green spotted with purple. *Leaves* in pairs on the old pseudobulbs, 6—8 in., with bullate sheaths at the base. *Scape* very short, rarely 2-flid.; flowers 2— $2\frac{1}{2}$  in. diam.; sepals and petals variable in breadth. *Hook. f. Fl. Brit. Ind. v. 841.*

Bot. Mag. t. 4691; Fl. des Serres, t. 1470; Griff. Notul, iii. 281.

SYN.—*C. Candida*, Lindl. in Wall. Cat. 1964. *Pleione maculata*, Lindl. in Paxt. Fl. Gard. t. 39, f. 1.; Jard. Fleur. t. 93. ? *P. diphylla*, Lindl. in Paxt. Fl. Gard. under t. 51; Fol. Orchid. 15; Walp. Ann. vi. 234. *Cælog.* Griff. Itin. Notes 44, No. 684. *Gomphostylis Candida*, Wall. MSS.

Var. *Arthuriana*, Veitch Man. Orchid. Pt. vi. 57.

Pseudobulbs smaller angular, flowers smaller, petals with purple lines, midlobe of lip margined with a purple band.

Rangoon, *Hook. f.* Fl. Brit. Ind. vi. p. 194, Suppl.

SYN.—*C. Arthuriana*, Rchb. f. in Gard. Chron. 1881, i. 40.

**25. *C. micrantha***, Lindl. in Gard. Chron. 1855, 173.

Pseudobulbs small oblong, leaves oblong- or linear-lanceolate, scape short erect few-fl., sepals oblong acute, petals filiform, side lobes of lip small oblong obtuse, midlobe large broadly oblong or rounded retuse disk covered irregularly with lamellæ and tubercles rising into short spines towards the contracted base where there are 3 oblong calli.

Tenasserim : at Moulmein (*Hort. Low*).

*Pseudobulbs* 1½ in., on a branching rhizome; sheaths membranous. Leaves 3—4½ in. *Scape* with raceme 1—2 in.; basal sheaths small, sub-acute; flowers ½ in. diam., “pale brown with sooty stains on the lip” Lindl.; “green with black specks on the lip,” Rchb. f.

*Hook. f.* Fl. Brit. Ind. v. 836—7.

SYN.—*C. papagena*, Rchb. f. in Bot. Zeit. 1862, 214.

**26. *C. nitida***, Lindl. Coll. Bot. 33; Gen. and Sp. 40; Fol. Orchid. 5 (all in part).

Pseudobulbs shining, leaves lanceolate, raceme 3—6-fl. erect or drooping, sepals oblong-lanceolate and linear 3—5-nerved petals obtuse white, lip with yellow eyes on the rounded side lobes, midlobe ovate. obtuse white, disk with 3 ridges and a yellow area bordered with red.

Burma; *Rangoon Agri-Hortic. Society's Collectors*.

Not given as Burmese by Hooker. *B. G.*

*Pseudobulbs* 1—3 in., crowded, ovoid oblong obpyriform or sub-globose; sheaths broad, rigid. *Leaves* 3—10 in., petioled, variable in breadth. *Scape* not sheathed; bracts deciduous; sepals 1½ in. long;



lip with a row of tubercles on each side of the midlobe, markings and spots very variable. *Capsule* 2 in. narrowly pyriform, angles obtuse. Wallich's *C. ocellata* is a mixture of *nitida*, *ochracea* and *cristata*. *Hook. f. Fl. Brit. Ind. v. 837.*

SYN.—*C. ocellata*, Lindl. in Wall. Cat. 1953 (in part); Gen. and Sp. 40; in Bot. Reg. 1839, Misc. 31; Bot. Mag. t. 3767 (not good) Floral Mag. N. S. t. 365; Walp. Ann. vi. 228; Veitch Man. Orchid. Pt. vi. 45.

*C. punctulata*, Lindl. Coll. Bot. 33 (ex Gen. and Sp. Orchid.).

*Cymbidium nitidum*, Roxb. Hort. Beng. 63; Fl. Ind. iii. 459.

—? *Cælog.*, Griff. Ic. Pl. Asiat. t. 328, f. 2.

**27. *C. ochracea***, Lindl. in Bot. Reg. 1846, t. 69; Fol. Orchid. 5.

A very old species, having pure white very sweet-scented flowers. The pseudobulbs are small, oblong, with two or three lanceolate leaves and the flowers grow in erect racemes 7 or 8 together. The lip has 2 horseshoe-shaped blotches on its disk, which are bright ochraceous-yellow bordered with orange. It may be grown either in a pot or a basket. *Williams.*

Non-Burman. Temperate Himalaya, alt. 5—7000 ft., from Kumaon to Upper Assam. *Hook. f.*

Pseudobulbs oblong, leaves petioled elliptic-lanceolate, raceme 6—8-fld., sepals linear-oblong acute and narrower petals white, lip white with confluent orange and yellow or brownish areas, side lobes serrulate, midlobe as long broadly ovate acute, base serrulate, disk 2-ridged.

Very near *C. corymbosa*, but pseudobulbs oblong polished, leaves narrower and longer petioled, scape more exserted very long in fruit. Flowers smaller, sepals only 1 in. long more obtuse, and midlobe of lip broader. *Hook. f. Fl. Brit. Ind. v. 831.*

Bot. Mag. t. 4661; Walp. Ann. vi. 226; Batem. 2nd. Cent. t. 145; Lem. Jard. Fleur. iv. t. 342; Moore, Ill. Orchid. Pl. Cœlogyne, t. 2.

Subspecies, *conferta*, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 146, t. 30, f. 3, with small elliptic acute leaves, shorter perianth segments

and entire side lobes of lip, may (as the authors suggest) be a different species. Hook. f. l. c.

Burma, *Parish*.

C. P. 150.

**28. *C. ovalis***, Lindl. in Bot. Reg. 1838, Misc. 91; Fol. Orchid. 12.

Pseudobulbs fusiform distant on a slender rhizome, scape 1—3-fld, shorter than the lanceolate leaves, sepals ovate-lanceolate pale yellow-brown, petals filiform, lip white or yellowish streaked with purple, lobes and surface and margins fringed with long black hairs.

Temperate Himalaya, from Kumaon eastwards, alt. 4—7000 ft. Khasia Mts., alt. 4000 ft. *Hook. f.*

Very near indeed to *C. fimbriata*, differing in the much longer ascending rhizome, narrower 2—3 in. pseudobulbs, and usually larger flowers; but it varies much in all these respects, as also in the breadth of the sepals and length of lamellæ on the lip.

*Capsule* 1 in., turgidly pyriform. *Hook. f.* Fl. Brit. Ind. v. 836. Walp. Ann. vi. 232.

In Parish's list of Burmese Orchids the references are Lindl. in Bot. Reg. 1838, Misc. p. 171; C. P. 243. See *C. fimbriata*, *B. G.*

SYN.—*C. fimbriata*, Lindl. in Wall. Cat. 1957.

*C. fimbriata*? Lindl. Griff. Notul. iii. 281; Ic. Plant. Asiat. 291, fig. 1.

? *C. pilosissima*, Planch. Hort. Donat. 104.

*Broughtonia linearis*, Wall. MSS.

**29. *C. Parishii***, Hook. Bot. Mag. t. 5323.

Pseudobulbs on a creeping rootstock, 5—7 in. long cylindrical smooth, surmounted by 2 oblong-lanceolate plicate leaves.

Peduncle of about 5 flowers in their axil, 6—7 in. high. Flowers large green, lip crested and marked with black streaks and spots. In this species the flowers terminate the fully developed matured pseudobulbs. *Parish*.

Pseudobulbs very long columnar angled, leaves elliptic or lanceo-

late, raceme 3—5-flid. drooping, flowers large green, sepals lanceolate acuminate, petals larger, lip panduriform, side lobes small, midlobe large broadly clawed broader than long, undulate, disk blotched with purple, ridges 4 pectinate on the midlobe warted along the mesial line.

*Pseudobulbs* 4—6 in., tufted, acutely or obtusely angled; sheaths short. *Leaves* 5—7 by 2—2½ in. acute. *Scape* stout, basal sheaths imbricate; flowers 3 in. diam.; sepals and petals yellow-green; lip blue-green; base of midlobe truncate, side lobes like auricles; column narrowly winged. Near *C. pandurata*. *Hook. f. Fl. Brit. Ind. v. 837.*

C. P. 105.

Tenasserim; at Moulmein, *Parish.*

**C. præcox**, see *Pleione præcox*.

**30. C. prolifera**, Lindl. in Wall. Cat. 1956; Gen. and Sp. 40; Fol. Orch. 10.

*Pseudobulbs* ovoid or oblong compressed, leaves petioled lanceolate, scape long very many-flid., raceme erect interruptedly sheathed, flowers small greenish yellow, sepals oblong, petals narrow linear, side lobes of lip short obtuse, midlobe orbicular retuse toothed, disk 2-lamellate.

Tropical Himalaya; Nepal, *Wallich*; Sikkim, alt. 2—4000 ft., *J. D. H. Khasia Mts.*, alt. 4—5000 ft., *Griffith, &c.* Burma, *Parish.*

*Pseudobulbs* 1½—2½ in., distant; *rhizome* clothed with distichous scales. *Leaves* 3—7 in., acuminate. *Scape* slender, terete; sheaths short obtuse; sepals ½—¾ in., 5—7-nerved; petals 1—3-nerved. *Capsule* ⅔—1 in., pyriform, angles obtuse. *Hook. f. Fl. Brit. Ind. v. 838.*

C. P. 174B; Walp. Ann. vi. 230.

**31. C. rigida**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 146.

*Pseudobulbs* distant, 3 in. or so, on a coarse, hard, branched root-stock, which is ⅓ in. in diam., ring-marked where the scales have fallen off, and sending out wiry roots from its under surface. The bulbs from 3—5 in. long, smooth when young, but much grooved when old and shrunk. *Leaves* 2, ovate-lanceolate, pointed. *Flowers* 8 or 10 in a pendulous raceme from between the leaves. *Raceme* 8 in. long, flowers ¾ in., rufous. *Sepals* oblong. *Petals* very narrow and standing back

from between the sepals. Lip 3-lobed, midlobe broad and itself 2-lobed, with 2 dark brown wavy crests. The unexpanded flowers have each a large ovate pointed bract embracing and nearly concealing them. These bracts are of a rich brown colour towards the point.

The flowers occupy about half the length of the peduncle, and at the base of the lowest flowers are a number of imbricated scales, extending back for about 2 inches. The old bulbs are generally surmounted by the hardened rigid remnant of the peduncle, which is almost hard enough to run into the hand. Hence the name. *Tenasserim. Parish.*

*Fl. Brit. Ind. v. 839; C. P. 42.*

**32. *C. Rossiana*,** *Rchb. f. in Gard. Chron. 1884, ii. 808.*

Pseudobulbs large 8—10-grooved, leaves elliptic-lanceolate petiolated, scape very stout decurved then suddenly upcurved 3—4-fld., closely clothed with short densely imbricate sheaths, lateral sepals narrowly linear-oblong acute and very narrow, petals white, lip narrow side lobes with rounded angles and brown sides, midlobe ovate entire revolute yellow, disk with 2 crenate lamellæ from base to apex and a slender median one.

*Pseudobulbs* 2—3 in., oblong or subpyriform; sheaths O. *Leaves* 8—12 by 2—3 in., strongly nerved, petiole 1—1½ in. *Scape* from the base of the pseudobulb, 2—3 in. long along its curvature, narrowed from the stout base upwards; sheaths coriaceous, green, tips rounded; raceme erect, 2—3 in., slender, lax-fld.; bracts ⅔ in. long, as long as the pedicel and ovary, lanceolate, concave, caducous; flowers 1½—2 in., diam.; sepals ⅙ in., broad; midlobe of lip not contracted at the base; column white. The strong decurvature of the scape is not mentioned by Reichenbach or Veitch. *Hook. f. Fl. Brit. Ind. vi. 193—4.* See also *v. 843.*

*Burma (Hort. Ross).*

*Veitch Man. Pt. vi. 48; Rolfe in Gard. Chron. 1889, 650; Bot. Mag. t. 7172.*

The flowers of this species are described by the late Prof. Reichenbach as cream-white with ligulate acute sepals and petals. Lip with ochre-yellow side lacinæ, the anterior lacinia being of the same colour

except the white top. Named in honour of H. J. Ross, Esq., Castagnole, Italy. *Williams*.

**33. *C. sanderæ*, Kränzlin.**

Pseudobulbs ovate tapering, 3—4 in. long 2-leaved, spike produced from the apex of the mature bulb. Flowers about the size of *C. barbata*, white with a deep orange blotch on the disk, furnished with 3 parallel keels which are covered with long dark brown hairs. Upper Burma. *Williams*.

Reichenbachia, 2nd. Ser., ii. t. 56 ; Gard. Chron., 3rd. Ser., 1893, xiii. p. 361, f. 52 ; Journ. of Hort., 1893, xxvi. p. 313, f. 59.

**34. *C. Schilleriana*, Rchb. f. in Berl. Allgem. Gartenz. 1858, 189 ; Xen. Orchid. ii. t. 134.**

Pseudobulbs  $\frac{3}{4}$  in. long. Leaves 2, at the end of the undeveloped pseudobulb, which, at this stage, looks like a narrow flower-stalk only, with imbricated bracts at the base.

Flowers solitary from between the leaves, about  $1\frac{1}{2}$  in. diam., sepals and petals tawny yellow, the latter very narrow. Lip 3-lobed, the lateral lobes oblong, rounded, parallel with the column ; the midlobe very broad, wavy, crisped, and notched at the point, colour yellow, with dark reddish brown blotches. The old bulbs are leafless at the flowering season. Moulmein and elsewhere. *Parish*.

Tenasserim, at Moulmein. *Lobb*.

Bot. Mag. t. 5072 ; Fl. des Serres, t. 2302 ; Fl. Brit. Ind. v. 834 ; C. P. 40.

**35. *C. testacea*, Lindl. in Bot. Reg. 1842, Misc. 38 ; Fol. Orchid. 2.**

Pseudobulbs narrow ovoid, leaves petioled, sepals lanceolate subacute and rather narrower, petals pale brown, side lobes of lip narrow dark brown margined with white, midlobe broad rounded crenate, disk with 4 spinulose ridges.

Singapore, *Hort. Loddiges*. Not given as Burmese by Hooker, but named in Parish's list. *B. G.*

*Pseudobulbs* 3—5 in., obtusely angled ; sheaths narrow. *Leaves*

6—8 in., lanceolate, 3—5-nerved. *Scape* sheathed up to the flowers, raceme many-fl., pendulous; bracts  $\frac{1}{2}$  in. cymbiform, acute, persistent; flowers  $1\frac{1}{2}$  in. diam.; column white, anther brown. *Hook. f. Fl. Brit. Ind. v. 829.*

Bot. Mag. t. 4785; Walp. Ann. 223; C. P. 41.

**35. *C. trinervis***, Lindl. in Wall. Cat. 1995; Gen. and Sp. 41; Fol. Orch. 4.

Pseudobulbs large ovoid, leaves long-petioled elongate-lanceolate, raceme short 4—6-fl., sepals lanceolate acute and linear-lanceolate 3-nerved petals white?, lip brown, side lobes short broad, midlobe broadly clawed subreniform retuse bordered with white, disk with 3 narrow ridges extending into the midlobe.

Tenasserim; at Tavoy, *Wallich*; Mergui, *Griffith*, *Parish*.

*Pseudobulbs* 2—3 in., curved; *rhizome* very stout. *Leaves* 10—18 in. 3-nerved; petiole 2—3 in. *Scape* with short basal sheaths; bracts lanceolate, caducous; flowers  $1\frac{1}{2}$  in. diam. *Capsule*  $1\frac{1}{2}$  in., narrowly pyriform, angles acute. Lip described from a drawing by *Parish*. *Hook. f. Fl. Brit. Ind. v. 833.*

C. P. 343.

**36. *C. ? uniflora***, Lindl. in Wall. Cat. 1966; Gen. and Sp. 42.

Pseudobulbs about 1 in. high, flask-shaped, seated closely on a creeping rootstock, terminated by 2 long linear leaves. Flowers 1 (sometimes 2) from the base of the *fully matured* bulbs, and not from the axils of the leaves (herein apparently forming an exception to the rule of the genus), about 1 in. long, orange-yellow. Lip 3-lobed; side lobes small acute; midlobe boat-shaped, with 3 orange-coloured streaks at the base, and 3 similar spots in the middle. Tenasserim; at Moulmein, *Parish*.

Given as a doubtful species by Hooker. *Fl. Brit. Ind. v. 842.*

C. P. 129.

SYN.—*Panisea uniflora*, Lindl. Fol. Orchid. 2; Walp. Ann. vi. 240.

*Epidendrum*, Griff. Ic. Pl. As. t. 313, f. 1.

**37. *C. ustulata*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 144 ; C. P. 174A.**

Pseudobulbs ovoid, leaves small elliptic-lanceolate, scape very slender erect, flowers small, sepals subequal, oblong acute, petals filiform, side lobes of very broad lip rounded, midlobe small orbicular retuse, disk with 2 curved smooth ridges.

Tenasserim ; at Moulmein, *Parish*.

*Pseudobulbs* 1—1½ in. ; rhizome stout. *Leaves* 1½—2 in., sessile or petioled, acuminate, rigid. *Scape* with raceme 4—5 in. ; bracts ¼—⅓ in., deciduous ; flowers amongst the smallest of the genus, yellow and brown, suberect ; sepals ¼ in. long ; lip saccate at the base, nearly orbicular in outline ; column winged above. Amongst Parish's admirable drawings is another plant named *C. ustulata* with pseudobulbs 2—3 in., leaves 4—6 in. lanceolate undulate, bracts nearly 1 in. long, much larger flowers with narrow sidelobes of lip and a much larger midlobe. *Hook. f. Fl. Brit. Ind. v. 840.*

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### KEY TO SPECIES.

#### CÆLOGYNE,\* Lindl.

Epiphytes ; rhizome creeping ; pseudobulbs 2- (rarely 1-) leaved. *Leaves* coriaceous, or thin and plaited. *Scape* usually short, flowers usually racemed, rarely (except in sect. *Pleione*) 2 or solitary ; bracts long, sheathing, deciduous. *Sepals* subequal, lateral saccate at the base. *Petals* narrower. *Lip* sessile at the base of the column, erect or embracing it, base concave or saccate. *Column* long, erect, winged, foot O ; top hooded, membranous ; anther more or less 2-celled ; pollinia 4, cohering in pairs by a granular viscus.

In some species of this genus the flowers are produced from the undeveloped pseudobulbs ; in others only from the fully developed ; and this character is quite constant. Again, in some species which flower from the undeveloped pseudobulbs the sheaths of the flowering scape are closely imbricating, and all coriaceous or membran-

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\* See Appendix A, Genus 34.

ous ; in others the inner sheaths are more or less foliaceous, or one or two may form fully developed leaves. This character does not so well limit species, but is very useful. Lastly, the presence or absence of sheaths on the scape of the species which flower from the mature pseudobulb, and their position, afford very constant characters. A consideration of these hitherto partially recognized characters suggests the following arrangement of the Indian species.

### Section I. EUCÆLOGYNE.

\* Flowers from an undeveloped pseudobulb at the base of the old pseudobulb. Sheaths of the scape all basal.

† Sheaths of the scape imbricating, none becoming foliaceous (except sometimes in *C. suaveolens*, *occultata*, *breviscapa* and *sulfurea*).

§ *Racemes pendulous or decurved, many-fl'd. (or few-fl'd. in C. cristata).*

No. 17, *C. flaccida* ; No. 21, *C. Huttneriana* ; No. 34, *C. testacea*.

§§ *Racemes erect or inclined, rarely drooping, many- or few-fl'd.*

No. 19, *C. fuscescens* ; No. 23, *C. lentiginosa* ; No. 26, *C. ochracea* ;

No. 20, *C. graminifolia* ; No. 35, *C. trinervis*.

† † Inner sheaths of the scape more or less foliaceous. (See also *C. suaveolens*, *occultata*, *breviscapa*, and *sulfurea*. All non-Burman species.)

No. 13, *C. corrugata* ; No. 14, *C. cynoches* ; No. 33, *C. Schilleriana*.

\* \* Flowers from the top of the mature pseudobulb.

† Scape sheathed at the base only.

No. 16, *C. fimbriata* ; No. 18, *C. fuliginosa* ; No. 24, *C. micrantha*.

No. 27, *C. ovalis* ; No. 28, *C. Parishii*.

† † Scape not sheathed either at the base or beneath the raceme.

No. 25, *C. nitida*.

† † † Scape with distichous imbricating sheaths below the raceme only.

No. 11, *C. barbata* ; No. 15, *C. elata* ; No. 29, *C. prolifera* ; No. 30, *C. rigida* ; No. 37, *C. ustulata*.

### \* Section II. PLEIONE. (See page 168.)

#### DOUBTFUL SPECIES.

No. 36, *C. uniflora*.

#### SPECIES UNKNOWN TO ME.

No. 12, *C. brachyptera* ; No. 22, *C. lactea* ; No. 31, *C. Rossiana*.



**Panisea,\*** Lindl.

Small tufted epiphytes; pseudobulbs crowded, 2-leaved. *Leaves* plaited. *Scape* lateral; flowers few, racemed; bracts membranous. *Sepals* and *petals* subequal, narrow, erect; lateral sepals saccate at the base. *Lip* as long as the sepals, adnate to the base of the column, claw sigmoid. *Column* slender, erect, 2-winged above, anther 2-celled, pollinia 4, ovoid, free or subcoherent by a viscus.

Very near *Ceclogyne* (to which Bentham has referred Lindley's other species), differing chiefly in the clawed lip. *Hook. f.*

**38. P. apiculata**, Lindl. Fol. Orchid. 2.

Lip broadly oblong apiculate.

Tenasserim; at Moulmein, *Lobb. Parish.*

*Pseudobulbs*  $\frac{1}{2}$  in., ovoid, 2-leaved. *Leaves*  $2\frac{1}{2}$ —3 in., shortly petioled, linear-lanceolate. *Scape* 1—2-fl., shorter than the leaves; basal sheaths membranous; bracts shorter than the pedicel; flowers  $\frac{1}{2}$ — $\frac{2}{3}$  in. diam., greenish or white with 2 small brown blotches on the lip; sepals keeled, acute; petals ovate-lanceolate, acuminate, lip with a saccate sigmoid claw, sides obscurely angled, tip sometimes obtusely 3-toothed. *Hook. f.* Fl. Brit. Ind. v. 783.

SYN.—*Ceclogyne apiculata*, Par. and Rehb. f. in Gard. Chron. 1865, 1035; in Walp. Ann. xvii. p. 225; C. P. 214.

**SUNIPIA**, Lindl.

A genus of two species only (as far as is at present known), one of which is found in Burma, *Parish.*

**1. S. scariosa**, Lindl. in Wall. Cat. 7373; Gen. and Sp. 179; Orch. Scel. 25; Sert. Orchid. Frontisp. x; Fol. Orch. 1.

A plant in habit like a *Bulbophyllum*, with creeping rhizome of the thickness of a goosequill bearing upon it, at regular distances of 2 or 3 in. ovoid pseudobulbs about 1 inch long, tapering upwards, each terminating in a single linear leaf, 6 inches by  $\frac{3}{4}$ , leathery. Inflores-

See Appendix A, Genus 16.

cence a spike on a long slender peduncle, erect for about 10 inches, with stem clasping scales at intervals, thence drooping for another 6 or 7 inches. Flowers very small, sessile, alternating on a zigzag rachis, each concealed by a glumaceous bract. Sepals ovate obtuse, the two lower uniting to form a keel. Petals much smaller, and nearly round. Lip articulated with the column 3-lobed, side lobes rounded, middle lobe elongated, blunt, solid, hollowed out at the base. Pollen-masses 4, collateral, nearly round, attached by pairs to two short blunt fleshy caudicles. Colour of flower white tinged with rose at the base. Lip pale yellow. Tenasserim, 4—5000 feet among the mountains. *Parish.*

*Pseudobulbs* 1—1½ in., ovoid. *Leaf* 4—6 by ¾—1 in., subsessile, subacute, or tip rounded. *Scape* 5—10 in., very slender; sheaths distant, tubular, truncate; spike curved, 2—6 in.; bracts ¼—⅓ in., very broadly ovate, acute, complicate, scariously coriaceous, nerved; flowers rosy, subsessile; ovary very short, obconic; sepals obscurely 3-nerved, and petals obtuse, very thick; disk of lip with an oblong callus. *Hook. f.* Fl. Brit. Ind. v. 772.

C. P. 271.

SYN.—*Ornithidium bracteatum*, Wall. MSS.

## KEY TO SPECIES.

SUNIPIA,\* Lindley.

A tufted epiphyte, rhizome creeping; pseudobulbs narrow, 1-leaved. Leaf coriaceous, many-nerved. *Flowers* small in a distichous spike, concealed by the imbricating bracts. *Sepals* very broad, subequal, spreading. *Petals* minute, rounded ovate. *Lip* small, sessile on the base of the column, erect, broadly tongue-shaped; midlobe thick, oblong, concave, margins recurved. *Column* very short, broad; anther suberect, sessile, persistent, cells distant; pollinia 4, ovoid, free or cohering by a viscus.

\* See Appendix A, Genus 10.

**AGROSTOPHYLLUM**, Blume.

Epiphytes with tufted sheathed flattened leafy stem. *Leaves* distichous, linear; sheaths, flattened, persistent. *Flowers* very small, white, crowded in sessile terminal heads, mixed with long paleaceous bracts, rarely in small racemes. *Sepals* erect, conniving, concave; lateral broader, adnate to the foot of the column. *Petals* narrow or broad. *Lip* adnate to the short foot of the column, short, erect, entire, or 3-fid. *Column* short, stout, thickened above; anther 2-celled; pollinia 8, ovoid, free or connected in fours by a small viscus. Hook. f.

**1. A. Callosum**, Rchb. f. in Seem. Fl. Vit. 296.

Sepals 5—7-nerved, petals orbicular many-nerved, lip broadly ovate or oblong obscurely 3-lobed concave with a large subbasal callus and 2 smaller ones at the lateral sinus.

Upper Burma, *Griffith*. (K. D. 5216).

*Stem* 12—18 in., *leaves* 5—7 by  $\frac{1}{2}$  in., narrowed from the base to the rounded notched tip; sheaths  $\frac{3}{4}$  by  $\frac{1}{4}$ — $\frac{1}{3}$  in., mouth truncate. *Heads* 1— $1\frac{1}{2}$  in. diam.; flowers  $\frac{1}{4}$  in. diam., pink; lip very variable, sometimes distinctly 3-lobed with the middle lobe orbicular from the same head with broadly ovate obscurely lobed lips; ovary obtusely angled, much longer than the obtuse inner bracts. *Hook. f.* Fl. Brit. Ind. v. 824.

**2. A. Khasianum**, Griff. in Calc. Journ. Nat. Hist. iv. 378, t. 19.

A plant with fleshy flattened stem about 5 in. long,  $\frac{1}{2}$  in. broad by  $\frac{1}{8}$ , bearing a leaf (possibly 2 leaves) at top. Leaf oblong 6 in. by 1 in. Flowers in a small dense head at the base of the leaf, interposed with brown bracts. The pollen-masses are 8. The plant grows in a tufted manner,—several stems near together. This is the meanest Orchid and the most *weedy*-looking that I know. *Parish*.

Tenasserim; at Moulmein, *Helper*, 5219, *Griffith*, etc.

Fl. Brit. Ind. v. 824.

SYN.—*A. planicaule*, Rchb. f. in Walp. Ann. vi. 909; C. P. 103.

*Appendicula Hasseltii*, Wight. Ic. t. 1748, f. 3 (not of Blume).

*Eria planicaulis*, Wall. MSS.

See, *A. Javanicum*, Bl. Tabellen 53.

## KEY TO SPECIES.

## AGROSTOPHYLLUM,\* Bl.

\* *Lip subentire or 3-lobed. Petals broad, 5—many-nerved.*

No. 1. *A. Callosum.*

\* \* *Lip with a concave hypochile, truncate in front, a broader epichile attached by a small base to its under surface. Petals linear, 1—3-nerved.*

No. 2. *A. Khasianum.*

## SPATHOGLOTTIS, Blume.

Terrestrial plants with subterranean corms ( "rhizomes under ground" Bentham in Fl. Hnk. Kng. p. 355), and sword-shaped plicate leaves. Lip articulate at the base of the column, not spurred but concave or saccate, 3-lobed, middle lobe contracted into a claw, and crested or tuberculated. Column winged or petal like. Pollen-masses 8, waxy. Scapes radical, leafless. *Lindley.*

These plants require thorough drainage, over which should rest a layer of living sphagnum moss to prevent the mould percolating into the drainage and choking it and thus preventing the free outlet of water, of which they require a good supply during the growing season ; but during the time when the corms are inactive just sufficient water should be given to keep the soil moist. *Williams.*

1. **S. Bensoni**, Hook. f. Ic. Plant. ined. t. 2087.

Tall, scape 18 in. or more, raceme elongate and flowers puberulous, bracts very small ovate-lanceolate flowers 1 in. diam., sepals subacute, midlobe of the saccate lip hardly longer than the side lobes sessile cuneately obovate.

Pegu ; on the Promie Hills, *Benson (Herb Maingay).*

*Leaf* 12 in., narrowly lanceolate. *Racemes* 6—10 in. ; *flowers* rather distant ; *bracts* 1/6 in. ; *pedicels* 3/4 in. *Capsule* 1 in. The specimens consist of a leaf and 2 racemes. Sidelobes of lip shorter

\* See Appendix A, Genus 30.

and broader than in *S. plicatu* ; the calli together form as it were an intermediate lobe, keeled at the back. *Hook. f.* in *Fl. Brit. Ind.* v. 814.

2. **S. Hardingiana**, Par. and Rehb. f. in *Otia Hamb. fasc. i.* p. 45 ;

Pseudobulbs about the size of a cobnut, terminated by 2 lanceolate pointed leaves much attenuated below, 6—7 in. long by  $\frac{3}{4}$  broad. The flowers are borne in a loose raceme of some 8—10, on 1 (occasionally 2) slender peduncle 9—10 in. high, with 2 or 3 sheathing scales nearly an inch long at regular distances upon them, springing from the base of the pseudobulb.

Peduncle red and covered with soft hairs. Each flower, which is nearly an inch in diameter, has a slender stalk 1 in. long, and a pointed bract at its base. Sepals ovate-lanceolate pointed. Petals same length and appearance but *much narrower*, all thrown backwards when in full flower. Lip long and narrow, awl-shaped, very acute, from a broad rounded base with a central longitudinal line. About the middle of the lip are two prominent lumps or callosities (one on each side of the line) of considerable size for that of the lip. The column is long, slender, arched (almost hooked at the end) and winged on the upper half. Anther 2-celled. Pollen-masses 8, long, tapering into caudicles, and cohering in 2 bundles of 4 by their glutinous extremities.

The colour of the unopened buds is greenish, that of the expanded flower clear white with just a blush of rose at the tips ; column rose ; anthers deep red purple, *and the callosities marked with red and yellow.* An extremely elegant little orchid sent me by Mr. Harding of Rangoon in 1873. I named it accordingly after him. I believe he received it from Bhamo. I grew it for 2 years, with the greatest ease, at Maulmein in a pot, where my one plant increased to 2 or 3. This species has been placed in this genus by Reichenbach, but, although terrestrial, the pseudobulbs are above ground, the petals are smaller than the sepals, and the lip is undivided. *Parish.*

North Burma ; Bhamo, *Herb. Parish.*

*Fl. Brit. Ind.* v. 815 ; *C. P.* 352.

**3. *S. Lobbii***, Rchb. f. in Walp. Ann. vi. 455 ; in Gard. Chron. 1876 (? 1856), 534.

Underground bulbs of irregular shape, 2 long linear-lanceolate leaves and long slender flower-stalks, which have from three to five yellow flowers, about  $1\frac{1}{2}$  in. across.

Sepals and petals broad, nearly the same size. Lip 3-lobed or tripartite, and of a remarkable shape (*midlobe of lip longer than the obovate oblong side lobes, claw slender suddenly dilating into an obcordately flabelliform smooth blade*. Hook. f.). Plant about 1 ft. high. Easy of cultivation and deserving of it. *Parish*.

Tenasserim Hills, east of Amherst ; Arracan, at Akyab, *Parish*.

Fl. Brit. Ind. v. 814, C. P. 368. Veitch Man. Orchid. Pt. vi. 7. In Veitch l. c. this species is described as a native of Borneo. *Hook. f.*

**4. *S. Pubescens***, Lindl. in Wall. Cat. 3744 ; Gen. and Sp. 120 ; in Bot. Reg. 1745, under t. 19 ; in Journ. Linn. Soc. iii. 22.

The above description (*of S. Lobbii*) applies to this orchid, the two plants differing only in points of small detail. *Parish*.

Mts. of Arracan and Burma, *Lobb. Griffith*, etc.

Fl. Brit. Ind. v. 814 ; C. P. 153.

SYN.—*S. Fortuni*, Lindl. in Bot. Reg. l. c. t. 19. (The Chinese *S. Fortuni* has a broader column than *pubescens* and the commissure of the side lobes of lip always villous, but I find no other differences. *Hook. f.*)

*Pachystoma Wightii* and *Fortuni*, Rchb. f. in Walp. Ann. vi. 464.

Var. *Berkeleyi*, leaf 14 by  $1\frac{1}{2}$  in., raceme many-fl., flowers  $\frac{3}{4}$  in. diam.

Arracan Hills, *Berkeley*.

The leaves of *S. Fortuni* being sometimes nearly a foot long, I venture to regard this as a variety of *pubescens*, as suggested by Lindley. *Hook. f.* Fl. Brit. Ind. v. 814.

Specimens of this in Herb. Calcutt. from Upper Burma have leaves 1 in. broad, the scape 18 in., and flower as in *Fortuni*, except that the midlobe is very thick, and its wings cuneately oblong and truncate. *Hook. f. l. c.* vi. 191. Suppl.

**5. ? *S. Plicata*, Bl. Bijd. 401, t. 76.**

Tall, stout, scape 2—3 ft., raceme puberulous, bracts ovate or lanceolate acuminate, flowers 1 in. diam. lilac, sepals broad acute, midlobe of lip longer than the side lobes, claw narrow dilating into a cuneately flabelliform blade.

*Pseudobulbs* when full grown 2 in. diam. *Leaves* 2—4 ft. by 1—3 in., finely acuminate; petiole 6—18 in.; raceme 6—12 in., many-fl.; bracts  $\frac{1}{2}$ —1 in., reflexed (in young plants flowers few and bracts larger); pedicel 1 in., calli of lip yellow, sparsely villous. *Capsule*  $1\frac{1}{2}$  in., pendulous. Griffith (Notul. iii. 324) gives the Khasia Hills as a locality (as well as Malacca) but this is a mistake. *Hook. f.* in Fl. Brit. Ind. v. 813.

Hooker gives Malay Peninsula; from Penang and Perak to Singapore as localities. The plant was furnished to Parish by Mr. Low, of Clapton, in a supplementary list of Burmese orchids. Parish remarks, "Lindley gives Java and Penang for this plant. Nothing is more likely than it should be found in Burma also, though Mr. Low may possibly have received it from the Straits ascribing it through error to Burma." *B. G.*

Lindl. Gen. and Sp. 119; in Wall. Cat. 3743; Walp. Ann. vi. 455.

SYN.—*S. lilacina*, Griff. Notul. iii. 323; Ic. Pl. Asiat. t. 311, f. 3.

*Bletia angustifolia*, Gaud. in Freye. Voy. Bot. 421, t. 32.

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### KEY TO SPECIES.

#### SPATHOGLOTTIS,\* Blume.

*Pseudobulbs* on a creeping terrestrial rhizome, broadly conic, 1—3-leaved. *Leaves*, long-petioled, elongate, narrow, plaited. *Scape* lateral; flowers racemed, often large. *Sepals* free, subequal. *Petals* subsimilar or longer and broader. *Lip* sessile, erect; lateral lobes erect, midlobe clawed; disk at its base tubercled or crested. *Column* long, arched,

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\* See Appendix A, Genus 22,

subclavate above and two-winged, foot O; anther 2-celled; pollinia 8, slightly cohering in fours.

\* *Pseudobulbs clothed with rigid fibres of old leaves. Scape tall, stout. Petals much broader than the sepals, many-nerved.*

No. 5, *S. Plicata*; No. 1, *S. Bensoni*.

\* \* *Pseudobulbs small, depressed conic, naked or nearly so. Scape usually very slender. Petals equalling or broader than the sepals, 7—9 nerved.*

No. 3, *S. Lobbii*; No. 4, *S. Pubescens*.

\* \* \* *Petals narrower than the sepals, 3-nerved.*

No. 2, *S. Hardingiana*.

### CALANTHE, Robert Brown.

This species is of easy culture, having evergreen foliage,—except in the case of the *vestita* group—(*C. Vestita*, *C. Veitchii*, *C. Turneri*, *C. Williamsii* and *C. Regnieri*), which are deciduous, losing their leaves during the season of rest. This deciduous group is sometimes separated from *Calanthe* as a distinct genus under the name of *Preptanthe*. *Limatodes* is also included as a near ally of *C. Vestita* by Bentham and Hooker. Nearly all the species have striking and attractive flowers, one peculiarity of which is that the claw of the lip is, in most cases connate with the column.

The evergreen species are rather larger upright-growing plants with plaited leaves: the long erect floral racemes come up between the leaves and are developed along with them. The deciduous species, produce their flowers after the leaves and bulbs are completed. They should be allowed to go to rest in a leafless condition after flowering until the season for again starting into growth. They are mostly terrestrial orchids and are best grown in pots. They are propagated by separating the bulbs. *Williams*.

1. *C. Biloba*. Var *Obtusata*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 144; C. P. 254.



Flowers larger (than in the type), blade of lip with a rounded apex and 3 obscurely caruncled nerves at the base, disk yellowish. *Hook. f.* in *Fl. Brit. Ind.* v. 848.

Tenasserim. *Parish.*

"Has a distinct gland, very Vandeous-like." *Parish.*

In connection with the above is given the following description of *C. Biloba*, Lindl. *Fol. Orch.* 3.

Lateral sepals broadly ovate falcate aristate 5—7-nerved, petals oblong acuminate 3-nerved, lip with a narrowly winged claw, blade very large broad deeply 2-lobed, lobes broadly hatchet-shaped or orbicular, sinus very acute with a basal apiculus, spur very short.

*Stem* short. *Leaves* 8—11 in., long-petioled, broadly elliptic or oblanceolate, caudate-acuminate. *Scape* 1½—2½ ft. with the long lax-fl. raceme, puberulous; bracts 1—1½ in., very slender, equalling the ovary; flowers 1 in. diam.; sepals and petals pale purplish; lip as broad as the rest of the flower, pale pink, blade naked, inner angles of lobes subacute. *Hook. f.* *Fl. Brit. Ind.* v. 848.

The type is not Burmese. *B. G.*

**2. *C. Clavata***, Lindl. in *Wall. Cat.* 7343; *Gen. and Sp.* 251; *Fol. Orchid.* 5.

Scape loosely sheathed, bracts much longer than the yellow flowers sepals oblong acuminate, petals broad, lip short broad, base rounded, side lobes small, midlobe suborbicular emarginate, base with 2 triangular lamellæ, spur clavate, as long as the ovary.

Assam and Upper Burma, *Griffith.*

*Rhizome* creeping; stem 4—8 in., sheaths long. *Leaves* 1—2 ft., long-petioled, narrowly lanceolate; nerves strong. *Scape* lateral, 10—20 in., stout or slender; young raceme crinite with bracts which are 1½ in. long; pedicels ¼ in., very slender; sepals ⅓ in.; lip very variable. *Capsule* ½ in., pendulous. *Hook. f.* in *Fl. Brit. Ind.* v. 854.

*Walp. Ann.* vi. 914.

**3. *C. Foerstermanni***, *Rehb. f.* in *Gard. Chron.* 1883, i. 814.

"Raceme cylindric dense-fl. ; bracts about equalling the yellow

flowers, midlobe of whitish-yellow, lip obreniform apiculate, spur clavate, half the length of the pedicelled ovary."

Eastern Burma, *Foerstermann*.

I have seen no specimens of this species, which is evidently very near *C. Curculigoides*. *Hook. f.* in Fl. Brit. Ind. v. 854.

**O. labrosa**, see *Limatodis labrosa*.

**O. Rosea**, see *Limatodis Rosea*.

#### 4. **O. Tubifera**, *Hook. f.*

Stem tall, internodes long, sheaths cylindric, leaves many distichous alternate narrow, scape lateral, sheaths inflated, raceme pubescent lax-fld., lip broadly oblong, base rounded, side lobes small, midlobe small sessile emarginate, spur O.

Upper Burma, *Griffith*.

*Stem* 15 in., about as thick as the middle finger; internodes loosely clothed with tubular sheaths 3—4 in. long. *Leaves* many, 6—14 in., sessile, linear-lanceolate. *Scape* 12 in.; raceme 6 in.; bracts not seen; sepals  $\frac{3}{4}$  in. long, lanceolate, acuminate; petals subsimilar; lip as long, twice as long as the column, without lamellæ, lateral nerves divergent crested, midlobe crisped. Flowers pubescent. *Hook. f.* in Fl. Brit. Ind. v. 855.

#### 5. **O. vestita**, *Lindl.* in Wall. Cat. 7345; Gen. and Sp. 250; Fol.; Orch. 10.

Scape from the base of a large pseudobulb and lax-fld. cernuous raceme villous, flowers rosy white or greenish, bracts large ovate, sepals ovate-lanceolate aristate 5-nerved, petals broadly oblong 5-nerved, lip very large, side lobes cuneately obovate, midlobe flabellately deeply obcordate, sinus acute, spur very long slender involute.

Tenasserim; at Moulmein, *Wallich. &c.*—Distrib. Borneo.

*Pseudobulbs* 2—5 in., ovoid, obtusely angled, leafing after flowering. *Leaves* 12—18 in., lanceolate, glabrous. *Scape* 12—18 in., stout below; sheaths few, large, acute; bracts  $\frac{3}{4}$ —1 in.; pedicels very slender with ovary  $1\frac{1}{2}$  in.; sepals 1— $1\frac{1}{2}$  in., petals obtuse or retuse and apiculate;

lip variable, exceeding the sepals; side lobes sometimes absent. The hybrids between this and *C. (Limatodis) Rosea, labrosa*, and others, are very numerous. *Hook. f.* in *Fl. Brit. Ind.* v. 852.

An extremely beautiful plant, widely distributed; always found on trees. *Parish.*

*Bot. Mag.* t. 4671; *Fl. des Serres*, t. 816; *Jard. Fleur.* iv. t. 333. *Paxt. Fl. Gard.* 147 (? 106), (with *lc.*); *Paxt. Mag.* xvi. t. 129; *C. P.* 20; *Veitch. Man.* vi. 70.

*SYN.*—*Cytheris Griffithii*, *Wight. Ic.* t. 1751—2. *Preptanthe vestita*, *Rchb. f. Bot. Zeit.* 1853, 493; *Walp. Ann.* vi. 460.

*Var. Nivalis.* A deciduous species of great beauty. It has large squarish silvery grey pseudobulbs, broadly lanceolate nervose leaves, which grow up and become matured after the flowering is over, and tall radical scapes of charming creamy white flowers. *Moulmein. Williams.*

*Wight. Ic.* v. t. 1752; *Paxt. Fl. Gard.* i. 106, fig. 720; iii. 38, wood-cut of plant.

*Sub-Var. Luteo-oculata.* A variety of the above which has a blotch of yellow in the centre of the lip. The flower-spikes are produced from October to February and are very dense. *Burma. Williams.*

*Bot. Mag.* t. 4671; *Paxt. Mag. Bot.* xvi. 129, with tab. *Lem. Jard. Fl.* t. 333. *Fl. des Serres*, t. 816; *id.* t. 1308—9, fig. 1; *Warner Sel. Orch. Pl.* t. 29, upper fig.

*Var. Rubro-oculata.* A free flowering orchid producing from Oct. to Feb. long drooping flower-spikes which are covered with soft white hairs, and rise from the base of the silvery green pseudobulbs before the latter produce their leaves. The flowers are upwards of 2 in. across; the sepals and petals delicate white, the lip the same colour, with a blotch of rich crimson in the centre. *Moulmein. Williams.*

*Paxt. Mag.* xvi. 129; *Regel. Gartenfl.* 1873, 751; *Warner Sel. Orch. Pl.* i. t. 29, lower fig. *Fl. des Serres*, t. 1308-9, fig. 2. *Veitch. Man.* vi. 71.

*SYN.*—*Gigantea*, *Williams Orch. Alb.* v. t. 211; *Veitch. Man. Orch. Pl.* vi. 70; *Hort. Belg.* 1889, 121.

*Var. Turneri.* A very handsome variety with jointed pseudo-

bulbs producing longer flower-spikes and larger flowers and these in greater quantity than in the older and better known *C. Vestita*. The flowers are more compact in shape, the colour being pure white, with a deep rose-coloured eye. A peculiar feature of the plant is that it blooms after the forms of *C. Vestita* are over. Moulmein. *Williams*.

Has the elongated pseudobulbs of *Regneri* and the flowers of *rubro-oculata*. *Hook. f.*

Veitch. Man. Orch. Pt. vi. 70.

Sub-Var. *Turneri nivalis*. An elegant variety with pure white flowers, which are in no other way different from those of *Turneri*. The plant flowers in winter and is especially valuable for wedding bouquets, or any other purpose for which pure white flowers are wanted. It blooms contemporaneously with *Turneri*. Burma. *Williams*.

***Calanthe Viridifusca***, see *Tainia Viridifusca*.

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## KEY TO SPECIES.

### CALANTHE,\* Br.

Terrestrial, often pseudobulbous. *Stem* short or tall, leafy. *Leaves* plaited. *Scape* axillary, terminal or from the side of the leafing pseudobulb; flowers small or medium-sized, racemed. *Sepals* subequal, spreading, rarely connivent. *Petals* broad or narrow. *Lip* adnate to the top or base of the column, 3-lobed, midlobe often deeply 2-fid., disk lamellate. *Column* long or short, obliquely truncate; anther conical or convex, 2-celled; pollinia 8, waxy, cohering in pairs by a granular viscus. *Capsules* drooping.

### Section I.

*Lip* at the top of the short stout column opposite to the stigmatic cavity. •

\* Bracts persistent. *Scape* usually from amongst the leaves.

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\* See Appendix A, Genus 37. *Limatodis* is included in *Calanthe* by Hooker in his *Fl. Brit. Ind.* B. G.

† Spur O or minute. (See *C. gigantea* at the end of genus, and *C. Mannii* in † †). *Neither species is Burman.* B. G.

No. 1, *C. biloba* var. *obtusata*.

† † Spur half as long as the sepals or longer (except *C. Mannii*).

§ *Flowers small; sepals*  $\frac{1}{4}$ — $\frac{1}{2}$  in. long. (See also *C. Veratrifolia* and *purpurea* in § §).

No Burmese species.

§ § *Flowers large; sepals*  $\frac{3}{4}$ —1 in. long; *petals broad* (except *Masuca* var. *fulgens*).

No. 5, *C. Vestita*.

§ § § *Flowers large*  $\frac{3}{4}$ —1 in. long; *petals narrow*.

No Burmese species.

\* \* *Bracts* caducous as the raceme elongates, equalling or exceeding the flowers. *Scape* shorter than leaves. *Flowers* black when dried.

No. 2, *C. Clavata*. No. 3, *C. Foerstermanni*.

## Section II.

*Lip* inserted at the base of the column, which is not embraced by its side lobes. *Bracts* very long, slender caducous. *Scape* always shorter than the leaves.

No. 4, *C. tubifera*.

Section III, see after *Limatodis*.

## **Limatodis**, Blume.

A small genus of beautiful terrestrial orchids related to *Phaius*, in which it is included by Bentham; it also closely resembles *Calanthe*.

The flowers have a spurred lip rolled around the column, from which it is free. It includes some species of a highly ornamental character. They are all Eastern, being found in Java, Sumatra, India, and China.

During the growing season these plants require a liberal supply of water at the roots—in fact they should be kept watered till they flower. After blooming they should be rested. They should be grown in pots

like *Calanthe Vestita*. They are propagated by dividing the pseudobulbs just when they begin to grow. *Williams*.

Terrestrial plants bearing pseudobulbs nourished by fibrous roots which penetrate the vegetable soil. In character very near to *Calanthe*. Sepals and petals spreading, nearly equal. Lip free, undivided, spurred. Column very short. Pollen-masses 8, as in *Calanthe*, without a gland. Leaves terminal, broad, plicate. Flowers in a raceme on a stalk which springs from the base of the pseudobulbs. *Parish*.

By a slip of the pen Lindley formerly wrote the name "*Limatodes*" but has corrected it in the *Folia Orchidacea*. *Williams*.

**6. *L. Rosea***, Lindl. in Paxt. Fl. Gard. t. 81; Fol. Orchid. 1.

Scape from the base of a large pseudobulb and many-fl., raceme villous, bracts ovate-lanceolate persistent, flowers large rosy, lip with narrow convolute side lobes and a large obovate oblong entire spreading midlobe, spur slender shorter than the sepals.

*Pseudobulbs* 4—8 in., obpyriform or fusiform, acutely keeled and grooved, leafing after flowering. Leaves 8—18 in., elliptic-lanceolate, acuminate. *Scape* 12—18 in., slender; pedicel and ovary  $1\frac{1}{2}$  in.; bracts  $\frac{1}{2}$ —1 in., green; flowers  $1\frac{1}{2}$  in. across; sepals ovate-lanceolate; petals oblong, acute; lip  $1\frac{1}{2}$  in. long, base yellow edged with scarlet; spur shorter, villous; column very short, pubescent. In many respects allied to *C. Vestita*, with which it hybridizes. *Hook f.* Fl. Brit. Ind. v. 856.

A charming winter flowering orchid, of which there are many varieties. A deciduous plant with fusiform pseudobulbs five or six inches long, much swollen at the base and terminated by broadly lanceolate membranous ribbed leaves. The flower-scapes proceed from the base of the pseudobulbs, and are nodding, attaining a height of one or two feet, bearing many flowers, which are generally of a pleasing shade of rose-pink, with a flat oval lip, the side lobes of which are white rolled over the column, and having a white throat surrounded by a well defined ridge of deep rich rose.

The pseudobulbs which are pale brownish or greyish colour, are

curiously constricted in the middle part, as seen in some forms of *Calanthe Vestita*. *Williams*.

A lovely plant, profusely abundant in the crevices and on the ledges of the limestone rocks about Moulmein, growing in loose, rich, vegetable mould. *Parish*.

Bot. Mag. t. 5312 ; Walp. Ann. vi. 921 ; C. P. 11.

SYN.—*Calanthe Rosea*. Benth. in Gen. Plant. iii. 521. Hook. f. in Fl. Brit. Ind. v. 856.

7. ***L. labrosa***, Rchb. f. in Gard. Chron. 1883, 44.

Habit, foliage, and inflorescence of *Calanthe (Limatodis) rosea*, but sepals yellow without, purplish within, as are the petals, lip flabelliform from a cuncate base retuse crisped pale purple with darker purple spots at the base, and spur longer than the sepals. *Hook. f.* Fl. Brit. Ind. v. 856.

Tenasserim, at Moulmein (*Hort. Veitch*).

SYN.—*Calanthe labrosa*, Rchb. f. in Gard. Chron. 44 ; and Hook. f. as above.

## KEY TO SPECIES.

### CALANTHE.

#### Section III.

*Lip* inserted at the top of the broad short column, its side lobes convoluted and embracing the column.

No. 7, *L. (C) labrosa* ; No. 6, *L. (C) rosea*.

### **Arundina.** Blume.

A genus of terrestrial orchids of considerable beauty. They have erect reed-like leafy stems, invested by the leaf sheaths, and the terminal loose racemes of large showy flowers, in which the sepals are spreading and the lip sessile, spurless, concave at the base surrounding the column. The few species are found in India and the Malay Peninsula. They are best grown in pots and need plenty of water in the growing

season. They are propagated by dividing the crowns and also by taking off and potting the young plants produced on the stems. *Williams.*

Terrestrial with tall erect leafy stems and 2-ranked leaves, and no pseudobulbs. Sepals lanceolate, equal, petals broader. Lip 3-lobed or entire, rolled round the column, without a spur. Column half-rounded, clavate, at the end. Pollen-masses 8, in fours. Flowers large handsome. *Parish.*

1. **A. bambusifolia**, Lindl. in Wall. Cat. 3751; Gen. and Sp. 125 (p. 123); in Bot. Reg. xxvii, Misc. 2; in Journ. Linn. Soc. iii. 22.

A fine evergreen terrestrial orchid, with reedlike stems, 3—5 ft. high, producing its flowers from near the top of the stem about July and continuing to bloom for some time during summer and autumn.

The leaves are ensiform, pale green, and the flowers, which grow several together on a terminal spike, are large, with pale magenta-rose sepals, and petals, and a rich rose lip striped with orange lines on each side the white throat. Burma. *Williams.*

Damp shady places amongst moist rocks. Akyab. *Parish.*

This species is not given as Burmese by Hooker, who gives, however, Chittagong as a locality. *B. G.*

Wight. Icon. t. 1661; Griff. Notul. iii. 329, 331; Ic. Plant. Asiat. t. 314; Walp. Ann. vi. 457; Fl. Brit. Ind. v. 857; C. P. 362; Bot. Mag. t. 7284.

SYN.—*Cymbidium bambusifolium*, Roxb. F. Ind. iii. 460.

*Bletia graminifolia*, Don. Prodr. 29.

*Limodorum graminifolium*, Hamb. MSS.

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## KEY TO SPECIES.

### ARUNDINA,\* Blume.

Terrestrial erect herbs with rigid terete sheathed simple stems, and narrow grassy distichous leaves. *Flowers* large, red, in terminal erect

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\* See Appendix A, Genus 38.



stiff simple or branched racemes or panicles. *Sepals* free, spreading, lanceolate, acuminate, flat, many-nerved. *Petals* broader, many-nerved. *Lip* large, broad, sessile on the base of the column and embracing it. *Column* long, slender, narrowly winged; foot O. *Anther-cells* 2, pollinia 8 in. compressed superposed pairs cohering by a viscus.

Section I. EUARUNDINA.

No. 1 *A. bambusifolia*.

Section II. DILOCHIA.

No Burmese species.

**Phajus.** Loureiro.

Terrestrial or epiphytic plants, generally tall and caulescent, though sometimes stemless and pseudobulbous. Scapes radical. Flowers showy. Sepals and petals free, spreading, nearly equal. Lip rolled at its base round the column, 3-lobed, or entire, spurred. The midlobe with ridges or raised crests. Column continuous with the ovary, half-round. Pollen-masses 8, nearly equal. *Parish*.

These plants are of easy culture. If fine specimens are wanted they should be grown in pots of large size with loam, leaf mould, and rotten cow-dung. They require plenty of heat and moisture at their roots in the growing season, but the water should not touch the young growth. During the period of rest they should be kept cool and supplied with very little water.

Propagation is effected by dividing the bulbs after the blooming season is past. *Williams*.

*Thunia* is united with *Phajus* by Hook f. in Fl. Brit. Ind. *B. G.*

**Phajus Albus**, see *Thunia Alba*.

**P. Blumei**, see *P. Wallichii*.

**1. P. Roseus.** Rolfe.

This very distinct *Phajus* was collected by the Rt. Hon. the Earl

of Scarborough and flowered in his collection in December last, and was sent to Kew for determination. The flowers are of a delicate light rose shade, the lip somewhat marbled with white-spots, the disk with a white hairy fleshy keel and a minute tooth at the apex, and the spur deep yellow. In fading the flowers pass to a light orange-buff shade. Upper Burma. *Kew Bulletin No. 73, 1893* (where the habitat is erroneously given as W. Africa), and corrected in *Kew Bulletin June 1894*.

**2. *Phajus Wallichii***, Lindl. in Wall. Pl. As. Rar. ii. 46, t. 158; Gen. and Sp. 126.

Leaves 1—2 ft. elliptic-lanceolate acuminate, scape very tall, sepals and petals spreading lanceolate acuminate, spur slender short or long, lip with a tubular limb and ovate-lanceolate acute or acuminate, sometimes truncate crisped midlobe.

Sikkim Himalaya; in tropical valleys, *J. D. H.* Assam and Sylhet, *Wallich*, &c. Upper Burma, *Griffith*. Tenasserim, *Parish*. Ceylon, alt. 2—4000 ft. Distrib. Malay Islands?

*Pseudobulbs* 1—1½ in. diam., conical, sheathed by the leaf-bases. *Leaves* 2½—8 in. broad, sometimes spotted; petiole 6—10 in. *Scape* 2—4 ft., sometimes thicker than the thumb; bracts 2 in., spathaceous, caducous; pedicel 1 in.; flowers 4—5 in. diam.; sepals and petals white greenish or rosy without, within yellow-brown with golden margin, rarely white or concolorous; tube of lip pink or red with a yellow base, midlobe orange, red, or white and pink; spur ¼—¾ in. long. *Capsule* 2—2½ in.

Possibly a form of the Chinese *P. grandifolius*, Lour. I know of no character whereby to distinguish *P. Blumei*.

Veitch (Man. Pt. vi. 15) describes *P. bicolor* as a variety of *Wallichii*, with small knobby rhizomes, and smaller flowers having a tawny yellow spur and tube of the lip, and white midlobe bordered with rose. It is a native of Ceylon. He retains *P. grandifolius* as a different species, including *Blumei* as a var. of it. The only tangible characters, except colour, by which he distinguishes *grandifolius* from *Wallichii* are that in the former the sepals and petals are oblong-lanceolate, and the lip

broadly obovate ; whilst in the latter the sepals and petals are linear-lanceolate and the lip broadly oval. He gives the Himalayas as habitat for both. His var. *Blumei* differs from the type (*grandifolius*) in the broader deep buff yellow petals and sepals faintly mottled with red. As habitats of *grandifolius* he gives, besides the original one of China, the Himalaya, Cochin China and Australia ; thus following Bentham (Fl. Austral. vii. 304), who includes *P. Australis*, *leucopheæus* and *Carronii*, of F. Muell under that species. *Hook. f.* Fl. Brit. Ind. v. 816 ; and vi. 191.

Paxt. Mag. vi. t. 193 ; Walp. Ann. vi. 459 ; Bot. Mag. t. 7023.

SYN.—*Limodorum Tankervilleæ*, Roxb. Fl. Ind. iii. 466 (not of Aiton) *Phajus grandifolius*, Lindl. in Wall. Cat. 3747 (not of Lour.).

? *P. Blumei*, Lindl. Gen. and Sp. 127 ; Blume Orchid. Archip. Ind. 2 t. 1 ; et t. 5D ; De Vreise illust. t. 8 ; Regel Gartenfl. 1865, t. 404 (? 464). *P. bicolor*, Lindl. l. c. 128 ; Sert. Orchid. t. 25 ; Bot. Reg. 1839, Misc. 61 ; Bot. Mag. t. 4078 ; Wight Ic. t. 1659-60 ; Thwaites Enum. 300 ; Blume Mus. Bot. ii. 178 ; Walp. Ann. l. c. 458.

Below is a description of *P. Blumei*.

A very handsome plant. From a creeping root-like caudex it produces roundish ovate pseudobulbs, which are marked by annular scars and develop lanceolate acuminate strongly plicate leaves 2 ft. long. The scape springs up from the base of the bulbs and grows 3—4 ft. high, terminated by a floral raceme 1 ft. long, the sepals and petals are lanceolate acuminate, olive brown, the lip rolled up over the column, ochraceous outside, the larger ovate undulated front lobe mucronate, crimson with a yellowish margin. *Williams*.

From Bhamo. *Parish, C. P.* 371.

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### KEY TO SPECIES.

#### **Phajus.\*** Lour.

Terrestrial or epiphytic large stout herbs. ' *Leaves* plaited. *Scape*

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\* See Appendix A, Genus 24.

lateral on the pseudobulb, or axillary or terminal ; flowers large, handsome, racemed. *Sepals* and *petals* subequal, spreading or suberect. *Lip* adnate to the base of and embracing the column, erect, base gibbous or spurred, midlobe various. *Column* long, stout, foot O ; anther incompletely 4-celled ; pollinia 8, attached by fours to a large granular viscus.

I am not sure that the following arrangement according to the position of the scape, being derived from often imperfect specimens, will hold good.

\* *Scape from the side of the pseudobulb, tall, stout.*

No. 2, *P. Wallichii*.

\* \* *Scape from the top of the pseudobulb.*

No Burmese species.

\* \* \* *Scape axillary or from amongst the leaves.*

No Burmese species.

\* \* \* \* *Raceme terminating the leafy stem.*

*P. Albus*. See *Thunia Alba*.

### THUNIA. Reichenbach fil.

A small genus of Asiatic orchids, by some included among Phajus, from which genus, however, they are readily distinguished by their manner of growth, and by several striking differences, as, for example, by their terete leafy stems, which grow in fascicles, by their deciduous leaves, and by their terminal drooping clusters of flowers provided with large membranaceous bracts. The structure of the flowers very closely resembles that of Phajus. Professor Reichenbach refers the genus to the tribe Arethuseæ.

The plants should be liberally supplied with water. They will grow on blocks, but pot culture is the best. The drainage must be perfect. After flowering the water given must be much reduced, only enough being given to prevent the bulbs shrivelling. They are propagated by division and also by cutting up the old stems into pieces about six inches long and inserting them in a pot in the same manner as

ordinary cuttings. This latter operation should be effected just when the young growths are complete. *Williams.*

Epiphytal plants, with leafy fascicled stems, slightly swollen at the base, clothed with alternate leafy sheaths from the bottom, enlarging upwards with normal leaves. Flowers few, 2—6, terminal, each with a spathaceous bract at the base. Sepals and petals lax, thin, wide-spreading, lanceolate, pointed, nearly equal. Lip parallel with the column, 3-lobed, bluntly spurred, the lateral lobes enveloping the column; middle lobe rounded, side lobes toothed. The stigmatic aperture is covered by a membrane which falls over and conceals it; very much as in *Vanilla*. Pollen-masses 4, or, by division 9, united by a thick fleshy stipes. Anther 2-celled, each cell subdivided again into two. *Parish.*

**1. *Thunia Alba*, Rchb. f. in Bot. Zeit., 1852, 764.**

The stems of this handsome plant are terete, about 2 ft. high, clothed throughout with leaves, the lower ones, produced when the stem first begins to lengthen, broad, round, amplexicaul and scale-like, oblong-lanceolate acute, 6—8 in. long, glaucous beneath, falling during the resting season so as to leave the slender terete stems bare. The flowers are produced on a short dense terminal nodding raceme just as growth is finished. The sepals and petals are pure white, oblong-lanceolate acute, and nearly equal; the lip is oblong-cucullate rounded at the apex, where it is denticulated, white, beautifully pencilled over the disk and front portion with purple and lilac. *Williams.*

Pseudobulb O, leaves distichous oblong- or linear-lanceolate acuminate, raceme sessile, bracts nearly as long as the flowers persistent, sepals and petals oblong-lanceolate acuminate, lip shovel-shaped with a broad toothed and crisped midlobe, disk with 5 crested ridges, spur short. *Stems* stout 6—18 in., densely tufted, pendulous, leafy from the slightly swollen base. *Leaves* 6—14 in., soft, glaucous beneath. *Raceme* 2—3 in., distichously 4—8-flid.; *bracts* 1½—2½ in., chartaceous, narrowly cymbiform, acute; *sepals* and *petals* erecto-patent, 2½—3½ in. long, white; *lip* white or light or dark yellow with purple red or ochreous veins. *Capsule* 1 in. long. Very variable in size

of flower and colour of lip. See vars. *Veitchiana*, Warn. Orchid. Alb. viii. t. 326; and *Wrigleyana*, Williams. *Hook. f. Fl. Brit. Ind.* v. 818.

Tropical Himalaya, alt. 2—5,000 ft., from Garwhal to Sikkim, ascending to 6,000 ft. Khasia Mts., alt. 4—5,000 ft. Arracan and Burina. The Concan; on Matheran Hill. *Graham, Dalszell, etc.*

Rev. Hort. 1874, t. 450; C. P. 378.

SYN.—*Phajus Albus*, Lindl. in Wall. Cat. 3749; Gen. and Sp. 128. Bot. Reg. 1838, t. 33; Bot. Mag. t. 3991; Knowles and Westc. t. 125; Paxt. Mag. v. t. 125, With tab. Grah. Cat. Bomb. Pl. 205; Blume Mus. Bot. ii. 181; Wallich Pl. As. Rar. t. 148; Fl. Cat. t. 125. *Hook f. in Fl. Brit. Ind.* v. 818 and vi. 192.

*Limodorum bracteatum*, Roxb. Fl. Ind. iii. 466.

Var. *Marshalliana*, Rehb. f. in Linnæa xli. 65.

A lovely species of free growing character. The stems are reedlike, erect, terete and leafy, the leaves oblong-lanceolate acuminate, 6 in. long, semi-amplectant, distichous pale green, glaucous beneath. The flowers, which are produced in June and July, are large, white, with the lanceolate-oblong acute spreading sepals and petals 2½ in. long, and the lip white with the lower part convolute around the column, streaked with yellow and purple on the upper side near the front, and produced behind into a retuse falcate spur, the front part spread out, roundish, golden yellow, with numerous forking veins of deep orange covering the whole surface except the extreme edge, which is white and beautifully frilled; the disk bears 5 yellow raised veins and 5 shorter ones on each side, all pectinately fringed with chrySTALLINE hairs. Moulmein. *Williams.*

Regel. Gartenfl. t. 1098; Warn. Orch. Alb. t. 130.

SYN.—*P. Dodsoni*, Dean Floral Mag. 1878 t. 329; *T. Marshalliana*, Williams; Veitch.

“Veitch\* (Man. Orch. Pt. vi. 19) keeps *Marshalliana* as a form from being usually more tall and robust, the lip shorter, the hairs on the crests of the lip more numerous and longer, the column shorter and stouter with apical wings more dilated.” *Hook. f.*

Sub. Var. *ionophlebia*, Rchb. Gard. Chron. 1885, 70.

Centre of lip pale yellow, sides streaked with purple. *Hook. f.*

Sub. Var. *Purpurata*, Rchb. f.

A very fine variety, "the superior half of the lip being pure white, and having five yellow keels on the disk; the anterior portion has numerous bright purple nervations outside, namely, on the sides, covered with yellow filiform processes; the middle is nearly white with very numerous yellow filiform processes; the fringed and wavy border is of the purest white, which affords an admirable contrast to the large purple spots, the numerous purple nervations giving the effect of spots at the distance." This novelty was communicated to us by W. E. Brymer, Esq., Dorchester. Burma. *Williams.*

Sub. Var. *Triloba*, Rchb. f.

A superb variety, first fld. by ourselves in 1888; the flowers are large; sepals and petals pure white, with an abruptly 3-lobed lip, which has dark reddish-brown veins, 12 darker rows of processes on crests. *Williams.*

Var. *Bensoniæ*, Hook. f. Bot. Mag. t. 5694.

Stems erect, leafy, terete, fascicled, from 1—2 ft. high, their lower parts clothed with broad roundish reflexed leafy sheaths, which pass upwards into the true leaves; these are distichous from 6—8 in. long, green above, slightly glaucous beneath. The flowers are large, 2—3 in. across, and produced, like those of *T. alba*, just when growth is finished, from the top of the stem in a short scarcely drooping raceme. The sepals and petals are spreading, oblong lanceolate,  $2\frac{1}{2}$  in. long, open, bright magenta, becoming white towards the base; the lip is large, open, the side lobes rolled over the column, magenta in front, white at the base, the central lobe oblong, frilled at the edge, of a rich magenta purple, the crests forming a broad oblong patch of yellow frilled keels occupying the disk. Mts. of Moulmein. *Williams.*

Jennings Orchid. t. 35; Williams. Orch. Alb. ii. t. 67; C. P. 199.

"Veitch Man. Orch. Pt. vi. 19, does not regard *Bensoniæ*, *Alba* and *Marshalliana* as specifically distinct; he distinguishes *Bensoniæ* from

*Alba* by the larger differently coloured flowers, with the midlobe of the lip larger in proportion to the whole lip, and more oblong, and by the wings of the column being toothed." *Hook. f. Fl. Brit. Ind. vi. 192.*

SYN.—*Phajus Bensoniæ*, Hemsl. in *Gard. Chron. 1882, 565.*

Var. *Brymeriana*, Rolfe.

This handsome species is an introduction of Messrs. F. Sander and Co., St. Albans, and flowered in their establishment in June 1892. A plant from the same source also flowered at Kew in the following year. It is allied to "*T. Marshalliana*" Rchb. f. and "*T. Alba*," Rchb. f. The sepals and petals are white and the throat of the lip yellow with numerous radiating crimson purple veins extending to the margin.

Upper Burma. *Kew Bulletin No. 89 (1894).*

Var. *Pulchra* Rchb. in *Gard. Chron. 1881, ii. 166*; *Flora 1872, p. 276.*

In general character like *T. Alba* and *T. Bensoniæ* but a very much larger plant. Whereas in these only 2 stems, one old and one new, go to form the plant, the variety under consideration has several stems growing in a fascicled manner, and these are 18 in. or 2 ft. long, as thick as the little finger, and leafy throughout. The flowers also are more numerous, 6—8 in a raceme.

They are white, hardly so large as those of *Bensoniæ*, and the lip is marked out with ochraceous lines in the disk, and yellow veins, whence the SYN. *Xanthophlebia*. Grows on trees in the plains about Moulmein. *Parish.*

SYN.—*T. Xanthophlebia* Par. and Rchb. fil. C. P. 5.

Var. *candidissima*.

This new species is described by Reichenbach as having the habit and appearance of *T. Marshalliana*. It has a nodding inflorescence of about 6 flowers; the spur is inflated and bilobed as in *T. Marshalliana*, the trifid lip having the anterior edges of the side lobes toothed, the midlobe has filiform processes, and there are also a few similar processes on the disk; the sepals and petals are white, and the throat is without any yellow colour. It was first flowered by Sir Trevor Lawrence, who



found it on an imported plant of *Dendrobium Wardianum*. Burma. *Williams*.

**2. *T. Marstersiana*, Kranzlin.**

This new species is described by Dr. Kranzlin as being exceedingly handsome, of strong robust habit ; the stems immediately above the ground are as thick as the thumb, and more than 4 ft. in height, with glaucous densely crowded distichous leaves, 10—12 in. long, nearly 2 in. broad ; in general appearance the plant is more like a palm than any other *Thunia*. “ It is, of course, nearly allied to *T. alba*, and perhaps even more closely to *T. pulchra*, but it differs from both ; the flowers are scarcely  $\frac{1}{2}$  the size of the two allied species, the labellum is more campanulate, only the extreme margin is revolute.” Named in honour of Dr. Maxwell T. Masters, F.R.S., Moulmein. *Williams*.

***T. Brymeriana*, see *T. alba* Var. *Brymeriana*.**

***T. Bensoniæ*, see *T. alba* Var. *Bensoniæ*,**

***T. candidissima*, see *T. alba* Var. *candidissima*.**

***T. Marshalliana*, see *T. alba* Var. *Marshalliana*.**

***T. pulchra*,**

***T. Xanthophlebia*,**

} see *T. alba* Var. *pulchra*.

## KEY TO SPECIES.

SEE AFTER PHAJUS.

## Tribe III. VANDEÆ.

Pollen-masses with a caudicula, united to a deciduous gland.

## MONOMERIA. Lindley.

Founded by Lindley on one species discovered by Wallich in Ne-

pal, to which Lindley gave the name of *M. barbata*. It was my good fortune in Feb. 1871 to find on Ta-ok, at about 3,000 ft., elevation, a solitary plant, looking exceedingly like a *Bulbophyllum*. Knowing by experience how very deceptive these *Bulbophyllum*-like orchids are, I brought it down to Moulmein, where it flowered, and proved to be a *Monomeria*. I thought I had Lindley's *M. barbata*, so very similar did it prove to his description and to his figure of that plant in his *Sertum Orchidaceum*. Eventually, however (to be short) Prof. Reichenbach pronounced it to be a distinct species, and gave it the name of *M. crabro*, from a fancied resemblance of the flowers to a hornet. *Parish*. I must refer the reader to the remainder of the article on *Monomeria* by the Revd. C. Parish in Theobald's edition of Mason's "Burma," as it is too long for quotation here. A special interest is attached to this plant, which appears to have been only once found on Ta-ok, in the Dauna range, east of Moulmein, at an elevation of 3—4,000 ft. *B. G.*

1. *M. crabro*, Par. and Reichb. f. in Trans. Linn. Soc. xxx. 143 t. 28; C. Pl. 312.

The rhizome, which is about as thick as a cedar pencil, and covered with scales, creeps extensively, emitting tough wiry roots from its under part. It has pseudobulbs seated upon it, several inches apart. These are pear-shaped, about 2 inches long, and terminated by a solitary leathery strap-shaped leaf, which is some 10 in. by 1½. The flowers are about 20, individually 1 in. long, forming a sparse raceme extending over about 9 in. of a curved drooping scape, which in total length is 15 or 16 inches. This scape springs from the base of the pseudobulb, and has several scales on its lower portion. The flowers, of a remarkable shape, terminate a germ of 1 in., in length, which, in fact, forms their peduncle, and at the base of the germ is a lanceolate bract. Of the 3 sepals the upper one is ovate triangular, sharp pointed, and stands erect, arched over the column which in part it conceals. The two lateral, or, in this case, more markedly lower sepals are oblong, oblique, pointed, parallel to each other, and cohering along their whole length so as, apparently, to form but one oblong-pointed seg-

ment. Petals minute, triangular, fringed. Lip elevated on the upturned end of the column, much shorter than the lower sepals, 3-lobed; lateral lobes small, triangular, acute; middle lobe oblong, with a mucro, or point, at the end. The colour of the upper sepal is yellow, that of the lip dark purple, and the two lower sepals are blotched with the same colour on a dark yellow ground. To my great surprise, on dissection, I found 4 pollen masses cohering in one round mass exactly as described by Lindley (in *M. barbata*), but also proceeding from between them, a rigid curved stipes, and at the end of it a gland, not a membranous gland as in *Vandææ*, but a firm gromous mass. *Parish.*

SYN.—? *M. barbata*, Lindl. in Wall. Cat. 1798; Gen. and Sp. 61; Sert. Orchid. Frontisp.

*Epicranthes barbata*, Rchb. f. in Walp. Ann. vi. 265.

"I find no characters whereby to distinguish *M. crabro* (from *M. barbata*); the analysis of the lip in the plate does not conform to mine. Possibly the Nepal habitat is an error. *Hook. f.* in Fl. Brit. Ind. v. 782.

Hooker's description of *M. barbata* is as follows:—

*Pseudobulbs* 2—3 in., ovoid, smooth. *Leaf* 8—10 in., thickly coriaceous, tip obliquely obtusely 2-fid, narrowed into the 4—6 in. petiole. *Scape* 12—18 in., flexuous; sheaths short, distant; raceme long; bracts  $\frac{1}{6}$  in.; flowers white speckled with purple, about 1 in. long; lip orange-brown.

Nepal, *Wallich.* Tenasserim, *Parish.*

## KEY TO SPECIES.

### MONOMERIA,\* Lindl.

*Pseudobulbs* 1-leaved, on a stout long rhizome. *Leaf* long, flat, thick, petioled. *Scape* from the rhizome long; flowers loosely racemed. *Dorsal sepal* broad, erect, complicate, acuminate; lateral much longer at the end of the naked foot of the column. *Petals* minute, broad, fimbriate. *Lip* small, jointed on the foot of the

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\* See Appendix A, Genus 14.

column, subcordate, margin revolute ; side lobes small, horn-like, apex terete obtuse, disk broad, lamellate. *Column* very short, broad, 3-toothed ; anther 1-celled ; pollinia 4, cohering by a globose gland.

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### **EULOPHIA**, Robert Brown.

#### CLASS I. EULOPHIA PROPER.

Column not produced into a foot. *Hook. f.*

Terrestrial plants, pseudobulbous. Roots fibrous from their base. Flowering stems sometimes terminal on the yet undeveloped leafy bulbs which grow out from the base of the old leafless bulbs, sometimes also several from various parts of the old bulb, simple or branched. Leaves long, membranous, plicate or smooth. Sepals and petals spreading, nearly equal, free, or adhering more or less to the column, which is lengthened into a blunt spur. Lip 3-lobed, middle lobe wrinkled, much veined or crested with hairs. Anther 2-celled. Pollen-masses (vandeous) 2, each with a mark as of a second and smaller lobe behind, attached by a small stipes (*caudicle* of Lindley) to a rather large gland. Flowers in racemes, numerous, single, of no great beauty, about 1 in. diam., generally greenish, with more or less of purple on the lip. *Parish.*

Among the Vandeous genera with plicate leaves and pseudobulbs, its chief peculiarity is the presence of a gibbose sac or spur at the base of the lip. The fifty species which are known are most abundant in tropical Asia, with one or two in Australia and an erratic species appears to have been found in Brazil.

*Culture.*—Very few species of this interesting genus are known in cultivation. They are best grown in pots, in a compost of good fibrous loam, leafsoil, and sand, with the addition of a little charcoal. Propagation is effected by separating the pseudobulbs. *Williams.*

I follow Blume, and others, in removing *Cyrtopera* from *Cyrtopodium* (where it is placed in Gen. Plant.), and including it as a section under *Eulophia*, there being a direct passage from the species with, to those without, a foot to the column.

In Sect. *Cyrtopera* the lateral sepals are inserted either on the foot of the column, leaving the spur or sac of the lip free, or their insertion extends along the spur, which then is technically a mentum.

The perianth of *Eulophia* is undistinguishable from that of *Geodorum* and *Tainia*, of which the former might but for habit be united with it; the latter differs in having a creeping rhizome, usually solitary leaves and more than 2 pollinia. *Chrysoglossum* resembles a *Eulophia* with the pollinia free from the rostellum. *Hook. f. Fl. Brit. Ind. vi. 1.*

The above arrangement is that followed here. *B.G.*

**1. *Eulophia bracteosa*, Lindl. in Wall. Cat. 7366; in Journ. Linn. Soc. iii. 23, Gen. and Sp. 180.**

Bracts very long, sepals oblong, tip rounded petals broadly obovate very many-nerved, lip narrowly obovate-oblong, obscurely 3-lobed, disk with 5 crenulate veins.

Tenasserim, alt. 3,500 ft., *Parish.*

*Stem* 4—6 in., sheathed. *Leaves* 1—3, 10—18 in., linear-lanceolate, petioled, 3-nerved. *Scape* stout, shorter than the leaves, clothed with long sheaths; raceme short, few-fl'd.; flowers fleshy; bracts 1—1½ in., sepals ⅔ in., yellow; lip white or lilac, streaked; spur short, obtuse. *Capsule* 1 in. Lindley's habitat of Ceylon for *Grandiflora* is no doubt an error. *Hook. f. Fl. Brit. Ind. vi. 3.*

C. P. 157.

SYN.—*E. grandiflora*, Lindl. Gen. and Sp. 181.

**2. *E. burmanica*, Hook. f.**

*Scape* robust, sheaths short loose, raceme many- and dense-fl'd. bracts filiform equalling the ovary, sepals 1/3 in. oblong obtuse many-nerved, petals narrower 3-nerved, lip cuneately obovate, side lobes short rounded, midlobe small ovate, disk with 2 carunculate nerves.

Upper Burma; Bhamo, *Griffith.*

*Tuber* or base of scape oblong. *Scape* 14 in.; sheaths 1 in.; raceme 4 in.; bracts ¼—⅓ in., almost capillary, reflexed; pedicel with ovary as long; spur conical; column short; pollinia globose. A remarkable species, of which there is but one very bad specimen with twisted scape; it is possibly near *E. macrobulbon*. *Hook. f. Fl. Brit. Ind. vi. 5.*

3. *E. graminea*, Lindl. in. Wall. Cat. 7372 ; Gen. and Sp. 182 : in Journ. Linn. Soc. iii. 23.

Leaves grass-like, bracts small lanceolate, sepals lanceolate acuminate and elliptic-lanceolate acute petals tessellate, lip obovate-oblong, side lobes small, disk with 3—5 lamellate or crested nerves which are fimbriate on the rounded midlobe. *Hook. f. Fl. Brit. Ind. vi. 2.*

Tenasserim, *Parish.*

C. P. Nos. 205 and 295.

SYN.—*E. inconspicua*, Griff. Notul. 349 ; Ic. Pl. Asiat. t. 326 ; Lindl. in Journ. Linn. Soc. iii. 25.

4. *E. lachnocheila*, Hook. f.

Scape stout, raceme lax-flid., bracts equalling or exceeding the ovary subspathaceous, sepals lanceolate acuminate and shorter elliptic petals many-nerved, lip narrow pubescent, side lobes short rounded, midlobe obovate-oblong retuse, margin waved, disk densely softly spiny.

Upper Burma ; at Maypongo, *Herb. Hort. Calcutt.*

*Tuber* globose. *Stem* 4—6 in. *Leaves* 2, linear-lanceolate, acuminate. *Scape* with the raceme 18 in. ; sheaths 2, acuminate ; raceme 6—8-flid. ; bracts  $\frac{2}{3}$ —1 in. membranous, linear-lanceolate, subspathaceous ; flowers 1 in. diam. ; lateral sepals inserted at the base of the column ; lip shorter than the sepals ; hypochile obovate, as long as the rather narrower epichile ; spur short, cylindric ; column rather long. *Hook. f. Fl. Brit. Ind. vi. 2.*

*E. Promensis*, Lindl. in Wall. Cat. 7365 ; Gen. and Sp. 181 ; C. P. 242. See *Eria* (*Tainia*) *Promensis*.

## Class II. CYRTOPERA, Lindl.

Column produced into a foot. *Hook. f.*

Terrestrial pseudobulbous plants, so near in their several characters to the preceding as by some to be united with that genus (*Eulophia*). Lindley distinguishes the genus by the absence of a spur, whereas it is present in *Eulophia*, but in the only two species known to me, pro-

nounced to be *Cyrtopera* by Prof. Reichenbach, there is a distinct spur, and it is simply in deference to his acknowledged authority that I have separated them from *Eulophia*. They affect damp shady jungles in places where vegetable mould abounds. *Parish*.

A small group of terrestrial plants, containing a few very handsome species. It is united by Bentham and Hooker with *Cyrtopodium*, from which it differs in its simple inflorescence, and in the lateral sepals being wider at the base and connate with the foot of the column. They have fleshy stems, in some cases short and tuberous, in others more elongated and fusiform, long thin plaited dark green leaves, and flowers generally of a showy character in erect spikes springing from the root. The few known species are widely scattered, occurring in India, Madagascar, South Africa, Peru, and the West Indies.

*Culture.* These plants resemble *Bletias*, and should be treated in the same manner. They should be potted in a mixture of turfy loam, peat and sand, but not elevated upon a cone above the rim of the pot. *Williams*.

**5. *Eulophia (Cyrtopera) Andamensis*, Rchb. f. in Flora 1872, 276.**

Raceme lax-flid., bracts short, sepals linear-lanceolate 3—5-nerved, acuminate, petals rather broader obtuse 3-nerved, side lobes of lip obtuse, midlobe large broadly clawed, orbicular, crisped retuse, disk with the 3 median nerves thickened between the side lobes, all other nerves thick, divaricating and much branched.

Tenasserim ; at Moulmein, *Parish*. Andaman Islands, *Kurz*.

*Stem* at the base tuberous, with thick roots. *Leaves* short during flowering, linear-lanceolate. *Scape* 1—2 ft. ; sheaths short ; bracts shorter than the pedicels ; sepals  $\frac{2}{3}$  in. long ; lip shorter than the sepals, white with green edges and nerves ; spur conic, obtuse ; anther 2-tubercled. *Hook. f.* Fl. Brit. Ind. vi. 8.

C. P. 94.

**6. *E. (cyrtopera) bicarinata*, Hook. f.**

Raceme oblong, densely many-flid., sepals linear-oblong acute

undulate, petals shorter, broader many-nerved, lip obovate-oblong, side lobes narrow, midlobe large orbicular crisped, two lateral nerves forming long calli at the base of the disk and with the median nerve tubercled on the midlobe.

Upper Burma, *Griffith*.

Flowering before leafing. *Scape* 8—30 in., stout or slender; sheaths inflated; bracts slender, short or long; flowers resupinate, purplish brown, greenish or yellowish; sepals  $1\frac{1}{2}$  in. long; lip longer than the sepals, tip rounded or notched; spur conical or obtuse. *Flowers* often streaked with pink. I have not seen the leaves, and Griffith does not describe them; he says the flowers are purplish brown and the lip broadly obtusely spurred. *Hook f.* Fl. Brit. Ind. vi. 6.

SYN.—*Cyrtopera bicarinata*, Lindl. in Wall. Cat. 7363; Gen. and Sp. 189; in Journ. Linn. Soc. iii. 31 (excl. cit. Ic. Griff.).

*Epipactis? bicarinata*, Herb. Ham.

*Cymbidium*, Griffith Notul. iii. 343, No 9; Ic. Plant. Asiat. t. 320, f. 3 (pollen), 7.

**7. *E. (Cyrtopera) holochila***, Coll. and Hemsl. in Journ. Linn. Soc. xxviii; 132.

Raceme lax-fl'd., flowers large, bracts about equalling the ovary, scape robust, sepals oblong obtuse, petals obovate-oblong tips rounded, lip orbicular entire or very obscurely broadly 3-lobed, disk smooth. *Hook f.* Ic. Plant. 2116, ined.

Burma; on the Shan Hills, alt. 4,000 ft. *Collett*.

*Leaves* very young at flowering time. *Scape* 12 in., as thick as a swan's quill, with two oblong ventricose obtuse sheaths below the middle; raceme 6 in.; bracts, slender membranous; pedicel with ovary  $\frac{3}{4}$  in.; flowers  $1\frac{1}{2}$ —2 in., broad; sepals 7-nerved, lateral adnate to the sides of the spur; petals 5-nerved, the outer pair branching outwards; lip about as long as the sepals, nerves very many parallel, mentum spur-like. Only one specimen seen by me. *Hook f.* Brit. Ind. vi. 196.

**8. *E. (Cyrtopera) macrobulbon***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 144.



Flowers grow in a dense raceme of many individuals, of a uniform dull brown, or burnt sienna colour. *Parish.*

Scape robust, raceme densely many-fl'd., bracts filiform, sepals linear-oblong acute, petals shorter elliptic obtuse many-nerved, lip cuneate, side lobes short subterminal, midlobe small orbicular crisped, disk with two nerves thickened at the base and together with the middle nerve crenate towards the apex.

Sikkim Himalaya ( *Ic. in Herb. Calcutt.*).

Tenasserim ; at Moulmein, *Parish.*

*Tuber* large. *Scape* with raceme 18 in., as thick as the little finger ; sheaths basal, loose ; bracts  $\frac{1}{2}$ — $\frac{2}{3}$  in., equalling the filiform pedicels ; sepals  $\frac{1}{2}$ — $\frac{2}{3}$  in. long ; petals rather broader ; lip shorter than the sepals ; spur conic, obtuse ; anther with a produced 2-fid top ; pollinia oblong. *Parish* describes the leaves as oblong, acuminate (more likely elliptic-lanceolate), sepals and petals brown, lip yellow, spotted red. The Sikkim drawing represents a stem as thick as the middle finger, with sessile obovate leaves 1—2 ft. long, purple beneath and on the margin ; a scape as thick as a goose-quill, dark purple, as are the flowers ; raceme 12 in., many-fl'd. ; bracts very slender, as long as the ovary ; sepals  $\frac{2}{3}$  in., long and petals violet-purple ; lip paler. *Hook. f. Fl. Brit. Ind. vi. 7.*

C. P. 37.

**9. E. (Cyrtopera) nuda**, Lindl. in Wall. Cat. 7371 ; Gen. & Sp. 180. Tall, raceme elongate many-fl'd., bracts various, flowers large green or purple, sepals linear-oblong acute, petals shorter elliptic-oblong many-nerved, lip obovate-oblong obtuse, side lobes obscure, midlobe rounded or retuse crisped, disk crested with many crenulate or tubercled nerves. Pegu and Tenasserim. Upper Burma (*Herb. Hort. Calcutt.*). *Hook. f. Tuber* large. *Leaves* 10—14 in., elliptic-lanceolate, very variable in breadth. *Scape* 1—3 ft., stout ; sheaths appressed ; bracts rarely equalling the ovary ; sepals 1 in. ; mentum rounded or conical ; lip shorter than the sepals. *Capsule*  $1\frac{1}{2}$  in., fusiform. There may be more than one species here, so great are the differences in colour of the flower, from a pale green to a dull purple. *Hook. f. Fl. Brit. Ind. vi. 6.*

SYN.—*E. bicolor*, Dalz. in Hook. Kew Journ. Bot. iii. (1857), 343; Dalz. and Gibs. Bomb. Fl. 264; Walp. Ann. vi. 647.

*Cyrtopera fusca*, Wight Ic. t. 1690; Lindl. in Journ. Linn. Soc. iii. 31; Thwaites Enum. 429; Walp. l. c. 668.

*C. plicata*, Lindl. in Wall. Cat. 7362; Gen. and Sp. 190.

*C. nuda*, Rchb. f. in Flora 1872, 274.

*C. Gardneri*, Thwaites Enum. 302.

*C. mysorensis*, Lindl. in Journ. Linn. Soc. iii. 32.

*C. laxiflora*, Gardn. MSS.

*Dipodium Roniayte* and *plicatum*, Herb. Hamb.

—? Rheede Hort. Malab. xii. t. 26.

10. ***E. (cyrtopera) squalida***, Lindl. in. Bot. Reg. 1841, Misc. 77 and Misc. 164.

The flowers grow in a loose sparse raceme, and are  $\frac{1}{3}$ —2 in. in diam. Sepals creamy-white striped with purple, petals pink; lip undivided, oblong, faint pink, with a broad yellow line down the middle. The anther has 2 horn-like appendages. *Parish*.

Raceme elongate many-flid., bracts equalling the ovary, sepals oblong-lanceolate acuminate, petals elliptic-oblong many-nerved, lip as broad as long, subequally 3-lobed, strongly closely nerved, midlobe crisped retuse, disk naked.

*Stem* rooting from the base without a tuber. *Leaves* 8—12 by  $1\frac{1}{2}$ —2 in., narrowly lanceolate, some long-petioled. *Scape*, 18—24 in., stout or slender; sheaths appressed; *sepals*  $\frac{2}{3}$ —1 in. long; *lip*  $\frac{2}{3}$  in. across the side lobes, base rounded, mentum conical. *Hook. f.* Fl. Brit. Ind. vi. 6.

Penang, on Govt. Hill, *Curtis*. Singapore, Ridley. Distrib. Malay islands. *Hook. f.* Tenasserim, *Parish*.

SYN.—*Cyrtopera squalida*. Rchb. f. in Bonpland. 1857, 38; Lindl. in Journ. Linn. Soc. iii. 31; Walp. Ann. vi. 668; C. P. 347.

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## KEY TO SPECIES.

## EULOPHIA, \* Br.

Terrestrial quite glabrous herbs ; rhizome tuberous, rarely pseudobulbous. Leaves appearing with or after the flowers, plaited. *Scape* lateral, flowers racemose, rarely paniced. *Sepals* and *petals* free, spreading. *Lip* erect from the base or foot of the column ; base saccate or with a mentum or short spur ; lateral lobes erect, embracing the column, rarely O ; midlobe spreading or recurved ; disk crested, softly spinous or lamellate. *Column* short or long, top oblique, entire ; anther terminal, 2-celled ; pollinia 2 or 4, sessile or attached by a short strap to a discoid gland of the rostellum.

## Section I. EULOPHIA PROPER.

*Column* not produced into a foot.

\* Leaves and flowers coetaneous, or nearly so.

† Pseudobulb very large, epigeal, green. Leaves very narrow. Scape often branched.

No. 3, *E. graminea*.

†† Roots tuberous, hypogeal. Leaves elliptic-lanceolate. Scape unbranched.

§ *Lip* longer than broad, side lobes short or O.

No. 1, *E. bracteosa* ; No. 4, *E. lachnochila*.

§§ *Lip* broader than long, side lobes short or O.

No Burmese species.

\* \* Flowers appearing long before the leaves. (I have not seen the leaves of any species of this subdivision).

No. 2, *E. burmanica*.

## Section II. CYRTOPERA.

*Column* produced into a foot.

\* *Lateral sepals* inserted on the spur of the lip (see also *E. explanata*).

No. 7, *E. holochila* ; No. 9, *E. nuda* ; No. 10, *E. squalida*.

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\* See Appendix A, Genus 39.

\* \* *Lateral sepals inserted on the foot of the column, free of the spur of the lip or nearly so.*

No. 5, *E. Andamanensis* ; No. 6, *E. bicarinata* ; No. 8, *E. macrobulbon*.

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### GEODORUM. Jackson.

Terrestrial, pseudobulbous. Petals and sepals free, nearly equal. Lip ventricose, obscurely 3-lobed, or entire, slightly spurred or pouched at the base, parallel with the column.

Column short, very broad, not produced below. Anther 2-celled, but the partition not prominent, with two little lappets inside, which serve to keep the pollen-masses in their place. These are two, with deep indentations, attached by a broad stipes to a transverse somewhat triangular gland. Old bulbs leafless, new undeveloped bulbs leafy. Leaves broad plicate, sheathing at the base. Scape from the base of the young leafy bulb, shorter than the leaves. Flowers incurved, drooping, rather dense racemes. *Parish*.

#### 1. *G. candidum*, Wall. Cat. 7374.

Flowers ascending or erect, sepals linear-oblong, petals almost orbicular 7—9-nerved, lip very broad, narrowed upwards from the 2-crested dilated base, disk nearly naked, tip crenulate.

Lindl. Fol. Orchid. (in part).

Burma, *Griffith* ; Tenasserim, at Moulmein, *Wallich*,

SYN.—*G. attenuatum*, Griff. in Calc. Journ. Nat. Hist. v. 338. t.

24.

Griffith further describes his *G. attenuatum* (which certainly is the same as Wallich's *candidum*) as having a truncate spike, subequal sepals and petals (which they are not in his drawing in Herb. Calcutt.), inodorous white wide flowers, less spreading than usual, tip of lip concave, almost conduplicate, emarginate, crenate, disk with a callus, column sprinkled with cellular pubescence below the stigma and along the broad nerves of the lip, and a very short column with a bidentate tooth on each side of the apex. It is a very distinct species. A single specimen

of *G. citrinum* is on the sheet with Wallich's specimens of this. *Hook. f.* Fl. Brit. Ind. vi. 17.

**G. candidum**, Lindl. Fol. Orchid. 3., SYN.—*Limodorum candidum* Roxb. from Sylhet, Khasia and Moulmein, is probably *dilatatum* (q. v.) ; it is certainly not *G. Candidum*, Wall. Cat. 7374. *Hook. f.* l. c.

**2. G. citrinum**, Jackson in Andrews' Bot. Rep. t. 626.

Flowers  $1\frac{1}{2}$  in. diam., yellow, sepals and petals very broad acute, lip large oblong deeply saccate with an obtuse gibbosity or spur, more or less streaked with red or purple, disk nearly smooth yellow, tip rounded or emarginate.

Moulmein, *Wallich, Parish.*

The fig. in the Bot. Repository represents a plant with bracts hardly exceeding the ovary, 4—5 pale yellow flowers  $1\frac{1}{2}$  in. in diameter, a large saccate subcalcarate lip broadly oblong with recurved margins, emarginate tip, and yellow and faint purple markings on each side of the smooth disk. The Bot. Mag. plant has flowers as large, but pale green, the lip is similar but not emarginate, and is streaked with red nerves ; the pedicels are much longer, with the ovary  $1\frac{1}{4}$  in. long, and there are many long bracts below, but not on, the raceme, where they are small. The *G. citrinum* Jaks. ? of Wall. Cat. 7375 has the long bracts below the inflorescence of the Bot. Mag. plant, but very short pedicels and a smooth lip with incurved and then reflected margins. The Penang drawing shows short pedicels, pale greenish white flowers, a saccate lip with recurved margins and red nerves ; there are only one or two bracts below the inflorescence, and the floral are as long as the ovaries. *Hook. f.* Fl. Brit. Ind. vi. 17.

Lindl. Gen. and Sp. 176 ; Fol. Orchid. 3 ; Bot. Mag. t. 2195 ; Bot. Reg. 626 ; Wall. Cat. 7375 ; Walp. Ann. vi. 633 ; C. P. 275.

Var. *albido-purpureum*, Par. & Rchb. f. in. Trans. Linn. Soc. xxx 145.

Has bracts as long as the flowers, but none below the inflorescence, green sepals and petals, and a dingy purple-streaked lip. *Hook. f.* Fl. Brit. Ind. vi. 18.

Moulmein, *Parish.*

**3. *G. dilatatum***, Br. in Hort. Kew, Ed. 2, v. 207.

Leaves usually sessile, sepals linear-oblong subacute 3—5-nerved, petals obovate-oblong 5—7-nerved, lip broadly cymbiform, tip dilated recurved crenulate or undulate, disk smooth or with granulate nerves ending in irregular small tubercles.

Burma, Assam, Sylhet, the Deccan Peninsular and Ceylon (all more or less doubtful). *Hook. f.*

If I am right in respect of this species, it differs from *purpureum* in its lower stature, broader petals and lip, the disk of which is smooth, granulate or subcaruncled. Wight's figure is probably an exaggeration of the flowers. *Hook. f.* Fl. Brit. Ind. vi. 17.

Lindl. Gen. and Sp. 175; Lodd. Bot. Cab. t. 1797; ? Wight. Ic. t. 912.—Lindl. in Bot. Reg. t. 675, is, I think, pale-fl. *purpureum*. *Hook. f.*

SYN.—*Limodorum recurvum*, Roxb. Cor. Pl. i., 33 t. 39; Fl. Ind. iii. 469.

*Malaxis cernua*, Wild. Sp. Pl. iv. 93.

*Otandra cernua*, Salisb. in Trans. Hort. Soc. i. 261.

? *G. candidum*, Lindl. Fol. Orchid. 3; Gen. and Sp. 176; C. P. 11.

SYN.—*Limodorum candidum*, Roxb.

**4. *G. purpureum***, Br. in Hort. Kew, Ed. 2, v. 207 (Char. reform.).

Usually tall, leaves at length petioled, sepals linear-oblong acute 3-nerved, petals rather broader obovate-oblong apiculate 5-nerved, lip sub-panduriformly oblong, tip dilated 2-lobed, disk with a broad channelled ridge ending in raised calli or a crenate callus.

Burma, *Hook. f.*

Brown's *G. purpureum* was founded on Roxburgh's drawing of *Limodorum nutans*, a native of the Circars, but of which no specimen is recorded to exist. It is represented and described as having the scape longer than the leaves, a lax-fl. raceme, and an acute lip; characters not hitherto found in any *Geodorum*. But if it be allowed that the elongate scape and lax-fl. raceme are due to the lengthening of the axis of the scape after flowering, and that the appearance of an acute lip is

due to the infolding of its margins towards the apex, then the *G. purpureum* is the commonest and widest-distributed Indian species. Dalzell and Gibson alone identify a plant with *G. purpureum*, Br., and I have examined authentic specimens of it, which they did not, for they give Brown's characters for the species, whilst those of their specimens are what I have given above. *G. purpureum* is the tallest and largest leaved Indian species; its flowers vary from white veined with red-purple to pale purple with stronger veins. *Hook. f. Fl. Brit. Ind. vi. 16—17.*

Lindl. Gen. and Sp. 175; Dalz. and Gibs. Bomb. Fl. 266.

SYN.—*G. dilatatum* Wall. Cat. 7376.

*Limodorum nutans*, Roxb. Cor. Pl. i. t. 40; Fl. Ind. iii. 470 (descr. and fig. in both erroneous).

*Malaxis nutans*, Wild. Sp. Pl. iv. 93.

*G. dilatatum*, Lindl. in Bot. Reg. t. 675, (C. P. 180) is, I think, pale-fl. *purpureum*. *Hook. f.*

## KEY TO SPECIES.

### GEODORUM,\* Jackson.

Terrestrial herbs, rootstock tuberous, hypogaeal. *Leaves* elliptic, acute plicate. *Scape* from the rootstock, stout, erect, sheathed, shorter than the leaves; flowers crowded in decurved racemes, bracts narrow membranous. *Sepals* and broader *petals* conniving or spreading. *Lip* sessile on the base or short foot of the column, cymbiform, membranous, margins involute, disk with or without ridges ending in calli, and with a forked basal callus. *Column* short, stout; anthers 2, cells appendaged after dehiscence by the persistent detached faces of the cells; pollinia 2, broad foveolate sessile or subsessile on a broad strap or gland.

I am unable to define the species from herbarium specimens, or to reduce to any system the descriptions and drawings of Roxburgh, Brown, Lindley and Griffith. The descriptions are provisional only. I have spent days to no purpose in endeavours to improve on it by the analysis of specimens.

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\* See Appendix A, Genus 42.

**CYMBIDIUM**, Sw.

Epiphytes with or without bulbous bases. Stems tufted. Roots few, fleshy. Leaves long, narrow, expanded at the base, and these alternately and closely overlapping one another, so as to form a sort of false stem. Flower-stalk of varying length, proceeding from the axils of the lower leaves, few- or many-fl'd.

Sepals and petals nearly equal, spreading. Lip 3-lobed, or undivided, free, articulated with the column, concave, without a spur. Column prominent, erect, half-round. Anther 2-celled. Pollen-masses 2, bilobed behind, sessile on a large triangular gland. Flowers generally handsome, in short few-fl'd. erect, or in many-fl'd. pendulous racemes. *Parish.*

Best grown in hanging pots, in which they require plenty of room. Propagation is effected by dividing the pseudobulbs. *Williams.*

1. **Cymbidium aloifolium**, Swartz in Nov. Act. Upsal. vi. 73 ; in Schrad. Journ. Bot. 1779, ii. 218. (not of Wight).

A common plant, at least in the Tenasserim Provinces, with long, narrow, hard, rigid, fleshy or leathery leaves, and a long drooping raceme of dull-coloured flowers. It forms large masses on trees. *Parish.*

Racemes elongate pendulous or decurved many-fl'd., flowers  $1\frac{1}{2}$ —2 in. broad, sepals and petals linear-oblong subacute, epichile broadly oblong or suborbicular equalling or shorter than the hypochile, disk with 2 curved thick lamellæ.

*Stem* short, stout. *Leaves* 1—3 ft. by  $\frac{3}{4}$ —2 in. *Raceme* 12—18 in. ; flowers variable in colour and size, usually dull purplish brown with pale borders.

I am much puzzled with this and the following species, which appear to differ, in so far as all my copious materials show, only in the comparative length of the epichile and hypochile of their lips, and in their geographical ranges, *aloifolium* being strictly northern and eastern, and *bicolor* as strictly western. These characters would be absolute were it not that Rheede's figure of the Malabar plant has the lip of *aloifolium*. According to drawings in Herb. Kew and Calcutta, *C. aloifolium* is very variable in other respects, and three varieties are distinguishable.



1. Racemes shorter suberect fewer-fl'd., sepals and petals obtuse dull purple with yellowish pale margins. This exactly resembles the Chinese (?) *C. aloifolium*, Lodd. Bot. Cab. t. 967; Jacq. Hort. Schoenb. iii. 69, t. 383. 2. Flowers larger, sepals and petals subacute bordered with white, lip yellowish streaked with red, all as described by Rheede. 3. Swartz's *C. pendulum*, which he says is too near *C. aloifolium*; flowers small or large, sepals and petals pale dirty yellow or greenish with a more or less broad dirty purple centre, lip streaked with red. To this belongs Wallich's *C. crassifolium* with pale flowers. Lindley distinguishes *C. pendulum* from *aloifolium* chiefly by the lamellæ of the lip of the former being interrupted clavate and arched behind, and of the latter continuous, approximate, confluent at their tips. Thwaites gives *aloifolium* as a native of Ceylon (Jaffna, *Gardner*), but, as he cites Wight's Ic., no doubt *bicolor* is intended. Lindley's *aloifolium* of Journ. Linn. Soc. iii. 27 includes this, *bicolor* and *sikkimense*. Reichenbach's description of *C. Mannii* is that of *aloifolium*, of which there are specimens in Mann's Herb. (kindly lent to me); as to his habitat of "Obres," Mr. Mann informs me he knows of no such place. *Hook. f.* Fl. Brit. Ind. vi. 10—11.

Tropical Himalaya, from East Nepal eastwards. Assam, and southwards to Tenasserim and the Andaman Islands. (? Malabar, *Rheede*). Distrib. China?

Roxb. Fl. Ind. iii. 458; Lindl. Gen. and Sp. 165; Wall. Cat. 7352 C; Walp. Ann. vi. 624 (excl. Ic. Wight); Sw. Willd. iv. 401; C. P. 12.

SYN.—*C. pendulum*, Swartz and Lindl. ll. c; Walp. l. c. (excl. cit. Bot. Reg.); Roxb. Cor. Pl. i. 35, t. 44; Fl. Ind. iii. 458. *C. crassifolium*, Wall. Cat. 7357. *C. Mannii*, Rehb. f. in Flora, 1872, 274. *Epidendrum aloifolium*, Linn. Sp. Pl. 953. *Ærides Borassi*, Smith in Rees' Cyclop. Suppl. Rheede Hort. Mal. xii. t. 8.

**O. cochleare**, Benth., see *Cyperorchis cochleare*.

2. **O. eburneum**, Lindl. in Bot. Reg. 1847, t. 67; in Journ. Linn. Soc. iii. 28.

Scape suberect 2—3-fld., sheathed to the top, flowers 4—5 in. diam. white, hypochile of lip with a very thick 3—5-grooved pubescent golden ridge.

*Leaves* 12—24 by  $\frac{2}{3}$ — $\frac{3}{4}$  in., acute or acutely 2-fid. *Scape* 8—12 in.; sheaths equitant, erect, lanceolate, finely acuminate; bracts acuminate; pedicel with ovary  $1\frac{1}{2}$ —2 in.; flowers very odorous; sepals very variable in breadth; petals subfalcate; side lobes of lip narrow, obtuse, midlobe small, short, undulately crenate, dark yellow. *Hook. f. Fl. Brit. Ind. vi. 11—12.*

Non-Burman.

*Bot. Mag. t. 5126; Paxt. Mag. Bot. xv. t. 145; Warner Sel. Orchid. t. 21; Jennings Orchid. t. 16; Gartenfl. 1880, t. 155; Orchidoph. 1882, 297; Wien. Ill. Gartenz. 1887, t. 7, 8; Gard. Chron. N. S., xvii. p. 497, fig. 78 (specimen plant); 1884, ii. 77, f. 17; Batem. 2nd. Cent. Orchid. Pl. t. 177; Veitch Man. Orchid. Pl. ix. 153; Orchid Album x. t. 467.*

SYN.—*C. Syringodorum*, Griff. Notul. iii. 338.

Var. *Parishii*; leaves broader, lip blotched with dark purple or crimson. Reichenbach distinguishes this by the callus of the lip having no velvety line, by the spots on the lip, and by acute setiferous angles of the pollinia. The sepals and petals are very much narrower than in Warner's figure. *Hook. f.*

Stems tufted, not bulbous; leaves 2-ranked, long, linear, 18 in., by 1 in., striated, over-lapping alternately at the base. Scape short erect about 3-fld.; flowers large, handsome, ivory-white. Sepals and petals ovate, pointed, nearly equal. Lip 3-lobed, very broad, square retuse, wavy at the edges; all these beautifully streaked with Roman red, bright yellow in the centre. Deliciously fragrant. A lovely plant, but too near to *C. eburneum*. *Parish.*

Shan Border, on trees, 1859; Tenasserim, on Nat-toung, alt. 5,000 ft. *Parish.*

SYN.—*C. Parishii*, Rchb. f. in Trans. Linn. Soc. xxx. 144; Xen. Orchid. iii. 55, t. 224 (very bad); in Gard. Chron. 1874, i. 338, 566; 1878, ii. 74; Warner Orchid Alb. t. 25; C. P. 56.

**C. Elegans**, Lindl. Sert. Orch. t. 14, See *Cyperorchis Elegans*.

**3. C. giganteum**, Wall. Cat. 7355.

Leaves 1—2 ft. by  $\frac{2}{3}$ — $1\frac{1}{2}$  in., elongate lanceolate acuminate, scape very robust 6—12-fld., decurved or suberect, flowers 2— $2\frac{1}{2}$  in. diam., sepals and petals oblong-lanceolate acute, green streaked with red, lip yellow blotched with purple pubescent and ciliate all over, midlobe large orbicular waved. *Hook. f.* Fl. Brit. Ind. vi. 12.

Non-Burman.

Lindl. Gen. and Sp. 163 ; Sert. Orchid. t. 4 ; Bot. Mag. t. 4844 ; Paxt. Mag. Bot. 241, and Fl. Gard. ii. 14, f. 143 (flower) ; Warner Orchid. Alb. vi. t. 284 ; Griff. Notul. iii. 341 ; Walp. Ann. vi. 626.

SYN.—*Iridiorchis gigantea*, Blume Orchid. Archip. Ind. 91, t. 26.

*Limodorum longifolium*, Ic. Hamilt. (fid. Lindl.).

Var. ? *Lowiana*, Rchb. f. in Gard. Chron. 1887, i. 684.

Leaves 2—3 ft. by  $\frac{1}{2}$ — $\frac{2}{3}$  in. finely acuminate, side lobes of lip pale yellow green, midlobe dark purple with golden margins. Perhaps a distinct species ; the leaves are more like those of *C. longifolium*. The racemes attain 5 ft. in length ; the very numerous flowers vary in colour and the lip in breadth. *Hook. f.*

A very distinct and beautiful variety, producing long drooping racemes of from 18—20 flowers, which are about 4 in. across ; the sepals and petals yellowish green with several faint sepia brown lines, and the lip cream colour, with large erect side lobes yellow, and having on the anterior part a large velvety maroon blotch margined with yellow. It flowers in Feb. and March. *Williams*.

Presumably collected in Upper Burma by Boxall, and sent to Mr. Low. I had a plant from the same quarter, which I at first took to be *C. giganteum* till I saw the flowers. *Parish*.

Burma, *Boxall* (*Hort. Low*). Fort Stedman, *R. Moore*.

SYN.—*C. Lowianum*, Rchb. f. in Gard. Chron. N. S. xi. 404. f. 56 ; Floral Mag. N. S. t. 353 ; Berlin Gartenz. 1885, t. 73 ; Orchidoph. 1882, 321 ; 1885, 145 ; Reichenbachia 2nd. Ser. ii. t. 53 ; Warner Sel. Orch. iii. 31 ; Veitch Man. Orchid. ix. p. 19 ; Orchid. Alb. x. t. 471.

**C. Lowianum**, see *C. giganteum*, var. *Lowiana*.

**C. Parishii**, see *C. eburneum*, var. *Parishii*.

**4. C. tigrinum**, Parish in Bot. Mag. t. 5457 ; C. P. 144.

Leaves short-petioled very coriaceous, scape with raceme longer than the leaves few-fl., bracts lanceolate shorter than the ovary, flower long-pedicelled, lip with 2 glabrous ridges on the disk between the side lobes.

*Pseudobulbs* 1—1½ in., turgidly ovoid, top contracted. *Leaves* 3—5 in., recurved, petiole rarely 1 in. *Scape* suberect, with the raceme 6—8 in., 3—5 fld. ; sheaths few ; bracts small, ovate-lanceolate ; pedicel with ovary 1—1½ in. ; flowers 2—2½ in. diam. ; sepals linear, subacute, dull yellow-green ; petals subsimilar ; lip narrowed at the base, white spotted with red, side lobes rounded erect, midlobe oblong, tip rounded apiculate ; anther smooth ; pollinia 3 angular, gland broadly triangularly obtuse above, sides acute. *Hook. f.* Fl. Brit. Ind. vi. 9—10.

It is found growing on rocky hills in the crevices of the rocks. It is a plant of easy culture, and bears very large flowers in comparison with the size of the pseudobulbs. Many of the *Cymbidiums* are gross in habit, and only suited to large collections. In *C. tigrinum* we have a plant suitable for every collection, compact in habit, taking up very little room, and lasting a long time in flower. *Berkeley* in Gard. Chron. 1887.

Tenasserim, on Moolee-it, alt. 6,000 ft. *Parish*. Burma, on the Siam frontier, *Berkeley*.

An interesting peculiarity of this species is the dimorphism of its flowers, observed by me on a large number of plants, on the top of Moolee-it, where it is abundant at about 6,000 ft.

There are two kinds of flowers on the same stem. Out of about six flowers, the terminal ones are different. They are of a rich red colour throughout, and rather blotched than striped, and their structure is imperfect. The column is quite abnormal, being unusually thickened, and less curved. There is no anther at all, and there are no pollen-masses ; but the edges of the column at the top are turned inwards so as to form a sort of hood, and underneath these edges is a small quantity of a

yellow waxy substance (pollen) in an amorphous state. And, occasionally, the intermediate flowers are intermediate also in condition, having no anther, but perfect pollen-masses, though without any triangular gland. *Parish.*

Some of the *Catasetums* and *Cynoches* bear two distinct types of flowers on the same spike, but, the differing flowers represent male and female sex. In *Renanthera Lowii* (*Vanda Lowii*) there is the same peculiarity, but on the authority of Mr. F. Boyle, the microscope has not yet discovered any sort of reason for such eccentricity in this plant. The dimorphism of *C. tigrinum* is not mentioned by Hooker. *B. G.*

### 5. *C. Traceyanum*, Hort.

A very distinct and beautiful novelty, intermediate between *C. Hookerianum* and *C. giganteum*. It was first flowered by Mr. A. H. Tracey of Twickenham. Flowers about 5 in. diam., sepals and petals yellowish-green, spotted longitudinally with crimson, front lobe cream-cold, spotted with crimson. Burma. *Williams.*

Journ. of Hort. 1890, xxi. p. 535, f. 71; Gard. Chron. 3rd. Ser., 1891, ix. p. 137, f. 34.

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## KEY TO SPECIES.

### CYMBIDIUM,\* Swartz.

Epiphytes, rarely terrestrial; stem very short, rarely elongate and pseudobulbous; roots tufted. *Leaves* very long, narrow and coriaceous, rarely short. *Scape* loosely sheathed; flowers often large in suberect or drooping racemes. *Sepals* and subequal *petals* free, erect or spreading. *Lip* sessile at the base of the column and embracing it upwards, base concave, side lobes erect, midlobe recurved; disk with usually 2 pubescent median ridges. *Column* long, foot 0; anther 1- or imperfectly 2-celled; pollinia 2 deeply grooved or 4, subglobose or pyramidal, sessile on the broad strap or gland.

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\* See Appendix A, Genus 40.

\* Leaves rudimentary or O at flowering time.

No Burman species.

\* \* Leaves elliptic-lanceolate.

No. 4, *C. tigrinum*.

\* \* \* Leaves loriform, very long, tip broadly unequally 2-lobed.

No. 1, *C. aloifolium*.

\* \* \* \* Leaves linear or elongate linear-lanceolate acute or acuminate.

† Bracts very small.

No. 2, *C. eburneum* Var. *Parishii*; No. 3, *C. giganteum* Var. *Lowiana*.

† † Bracts large, lanceolate or cymbiform.

No Burmese species.

### CYPERORCHIS,\* Blume.

Habit foliage and inflorescence of *Cymbidium*, but racemes dense-fid., perianth segments narrow and connivent below the middle or higher, lip nearly straight, erect, epichile small and very much shorter than the elongate hypochile, and pollinia usually pyriform on a short subquadrate gland.

Except by the narrow lip, long hypochile, and small usually orbicular epichile (or midlobe), it is not easy to separate this genus from *Cymbidium*, for the pollinia vary much in form in both genera, and *Cyper. Masterii* resembles very much *Cymb. eburneum*. Hook. f.

1. **Cyperorchis cochleare**, Benth. in Journ. Linn. Soc. xviii. 318. Raceme elongate, sepals and petals very narrow, flowers 2 in. long, greenish brown, lip glabrous, median ridge strong 2-fid or spatulate at the tip vanishing downwards, column very slender glabrous, pollen-masses pyriform, capsule 1½ in. long.

Not given as Burmese by Hooker.

\* See Appendix A, Genus 41.

*Leaves* 2—3 ft. by  $\frac{1}{3}$ — $\frac{1}{2}$  in. Scape 12—18 in., lax; sepals and revolute petals brownish green; lip yellow speckled with red, midlobe suborbicular, golden-yellow. *Hook. f.* in Fl. Brit. Ind. vi. 15.

SYN.—*Cymbidium cochleare*, Lindl. in Journ. Linn. Soc. iii. 28, 178.

2. *C. elegans*, Blume Rumph. iv. t. 47; Orch. Archip. Ind. 93. t. 48 C.

A very rare and curious species producing many-fl. nodding racemes of pale tawny-yellow blooms, which have the peculiarity of remaining half closed. It is one of the bulbless group, with linear-ensiform leaves and cylindraceous flowers, which are spotted inside the lip with blood red. Flowers in the autumn. *Williams*.

Not given as Burmese by Hooker.

Bot. Mag. t. 7007; Fl. Brit. Ind. vi. 14.

SYN.—*Cymbidium elegans*, Lindl. in Wall. Cat. 7345; Gen. & Sp. 163; Sert. Orchid. t. 14; in Journ. Linn. Soc. iii. 28; Rchb. f. in Gard. Chron. 1875, i. 492.

*C. densiflorum*, Griff. Notul. iii. 338 (the Myrung plant only).

### THECOSTELE, Reichb. f.

Sepals and petals spreading, free, the former ovate, the latter narrow linear. Lip continuous with the column, 3-lobed. Column long, terete, incurved, 2-horned at the top. Anther 2-celled. Pollen-masses 2, deeply notched behind, attached by 2 thin elastic stipites to a broad rounded gland. Pseudobulbous; leaf single, terminating the bulb. Scape many-fl. radical. *Parish*.

1. *T. Zollingeri*, Rchb. f. in Bonpland. v. 37; Xen. Orchid. ii. 133, t. 147.

Bulbs aggregate, ovate, somewhat flattened, ribbed, each one terminate by a broadly ovate solitary leaf which is 5 in. by 2.

The bulbs are yellowish, the leaves dark green. Scape drooping, 6—7 in. long, scaly towards the base. Flowers numerous,  $\frac{3}{4}$  in. across,

spotted with red on a yellowish ground. Lip with 2 small rounded lateral lobes, and an elongated obovate midlobe, which is hairy in the middle and retuse, *i.e.*, it has the centre of a rounded end depressed, colour red, with pale yellow margin. Column remarkable, retreating at the base, then arched forward like a swan's neck, and it has 2 horn-like appendages. On trees in the neighbourhood of Moulmein. Flowers during the rains. *Parish.*

Fl. Brit. Ind. vi. 19.

SYN.—*T. alata*, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 135. (? 144, t. 29.) ; C. P. 47.

*Cymbidium alatum*, Roxb. Fl. Ind. iii. 459.

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### KEY TO SPECIES.

THECOSTELE,\* Reichb. f.

Epiphytes, pseudobulbous. *Leaf* 1, shortly petioled. *Scape* basal slender ; flowers racemed. *Sepals* subequal, broad. *Petals* much narrower. Lip connate with the foot of the column, 3-lobed ; base with the foot forming a ventricose tube perforate in front ; side lobes small, erect ; midlobe entire or 3-lobulate, velvety. *Column* slender, arched, with incurved apical wings ; anther 2-celled ; pollinia 2, subglobose, separately stipitate on a scale-like gland.

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### BROMHEADIA,† Lindl.

Terrestrial, erect, rigid leafy herbs, pseudobulb O. *Leaves* distant. *Flowers* in terminal simple or branched rigid racemes or panicles ; bracts thick, imbricate, persistent. *Sepals* and *petals* subequal, narrow, widely spreading. *Lip* adnate to the base of and embracing the column, erect.

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\* See Appendix A, Genus 45.

† See Appendix A, Genus 46.



side lobes erect, midlobe spreading entire. *Column* membranous, broadly 2-winged, foot O, top hooded; anther sub-2-celled; pollinia 2, ovoid, sulcate, sessile on a scale-like gland. Hooker f.

1. **B. aperioides**, Par. and Rchb. f. in *Otia Bot.* Hamb. 1878, fasc. i. p. 44; C. P. 364.

A small plant, 2—3 in. high, with distichous, rigid, hard, sharp-pointed, scimitar-shaped leaves, having very much the appearance of an *Aporum* for which, in the absence of flowers, it might be taken. Flowers terminal on a short scaly stalk, large for the size of the plant, 1 in. long. Sepals and petals linear-lanceolate, nearly equal, connivent. Lip parallel with the column, which is that of a *Calogyne*, long, curved, winged and projected beyond the anther. Pollen-masses 2, like those of *Cymbidium*, sessile, on a large triangular gland. Colour of flowers white, lip excepted, which is 3-lobed; side lobes streaked with pink, pointed, almost as long as the small triangular middle lobe, which has a yellow crest. Flowering time April. Tenasserim; at Moulmein, *Parish*.

Fl. Brit. Ind. vi. 20 (marked as doubtful).—"I suspect the species will prove to be generally distinct" (from *B. palustris*). "The habit is that of *Dendrobium atropurpureum*." Hook. f.

## LUISIA, Gaudichaud.

Plants with elongated woody stems, long aerial roots, terete leaves and small mostly inconspicuous flowers. Pollen-masses 2, notched behind, united by a broad stipes to a triangular gland. *Parish*.

### 1. **Luisia Amesiana**, Rolf.

This species was sent to Kew by Messrs. Hugh Low & Co., of Clapton, in June 1891, who state that it was imported together with *Vanda Kimballiana*, Rchb. f. Thus its habitat must be on the hills of the Southern Shan States, at 4,000 to 5,000 ft. elevation. Shortly afterwards it was sent by Messrs. Sanders & Co., of St. Albans, who gave its native country as "Burma." It has since been received from

**Glasnevin.** It is allied to *L. macrotis*, Rchb. f. (*non-Burman*), but has flowers more than twice as large. The sepals and petals are pale yellowish white, slightly suffused with purple near the apex, and having a few obscure dull purple markings on the back. The lip is suffused with purple and blotched with dark purple, the margin being light greenish yellow. The column is pale green. Southern Shan States, Burma. *Kew Bulletin*, No. 79, 1893.

Gard. Chron. 3rd. Ser. 1893, xiv. p. 32. f. 9.

**2. *L. brachystachys***, Blume Rumph. iv. 50; Mus. Bot. i. 64. Leaves 2—6 in., slender, sepals and petals as in *L. teretifolia*, lip obovate-oblong nearly flat grooved hardly constricted at the base of the broadly-ovate epichile.

Tenasserim; (*lc. Parish.*).

A more slender plant than *L. teretifolia*, but perhaps a variety; flowers of the same size, but with a very different lip, which varies a little in breadth, and in the distinctness of the hypochile from the epichile. The lip is rather thin, with usually strong parallel grooves or nerves, though sometimes it is very broad and fleshy, when the grooves are not visible (in a dried state). *Column* very short. *Capsule*  $\frac{3}{4}$ —1 in.—Clark describes the sepals green without, rose-purple within; petals rose-purple with green tip and base; lip yellow at base, black-purple for  $\frac{2}{3}$  of upper part, but variable. *Hook. f.* Fl. Brit. Ind. vi. 23.

Rchb. f. Xen. Orchid. i. 204, t. 78. f. 1; Lindl. Fol. Orchid. 3; C. P. 43.

SYN.—*Mesoclastes brachystachys*, Lindl. in Wall. Cat. 1994; Gen. and Sp. 45.

Parish gives *L. flavida*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 144, which reference Hooker gives for *L. teretifolia* Var. *flavida*.

***L. platyglossa***, Rchb. f., see *L. teretifolia*.

**3. *L. primulina***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 144. t. 30A.

Stem short, very stout, leaves 3—4 in. very stout, rachis short few-

fid., sepals subequal oblong acute, petals larger obovate-spathulate obtuse, lip much longer than the lateral sepals yellow, hypochile small short saddle-shaped, epichile large triangular-ovate obtuse, margin obscurely lobulate.

Tenasserim ; Moulmein, *Parish*.

*Stem* 3—4 in.; internodes short. *Leaves*  $\frac{1}{3}$  in. diam. *Flowers*  $\frac{2}{3}$  in. diam., pale yellow with a purple column. Described chiefly from a drawing by Parish. A drawing in Herb. Calcutta of apparently the same species (collected at Moolyet, Moulmein) has elliptic-acute sepals, a shorter cordate epichile, a larger hypochile with a purple disk and a yellow column; its concave lateral sepals are spurred at the back. There are at Herb. Kew flowers and leaf of a cultivated plant from Burma (Hort. Kew), resembling this, but with a purple lip. *Hook. f. Fl. Brit. Ind. vi. 24.*

C. P. 302.

**4. L. Psyche**, Rchb. f. in Bot. Zeit. 1863, 98 ; in Gard. Chron. 1863, 342.

Stem tall and stout, leaves 3—5 in., stout, rachis short, flowers few, large ; petals linear-spathulate or obovate-obtuse twice as long as the obtuse concave sepals, lip broadly ovate-oblong retuse, base contracted saccate 2-auricled.

Tenasserim ; at Moulmein, *Parish*.

*Stem* 1 ft., internodes 1 in. *Leaves* strict,  $\frac{1}{4}$  in. diam. *Sepals*  $\frac{1}{2}$  in. long, petals  $1\frac{1}{4}$  in., variable in breadth, both pale greenish yellow. *Lip* convex, nearly 1 in. long, violet-brown, tessellated with white or yellow, auricles erect, embracing the white column. *Capsule*  $1\frac{1}{2}$ —2 in. long. *Hook. f. Fl. Brit. Ind. vi. 24.*

Bot. Mag. t. 5558 ; Batem. 2nd. Cent. t. 174 ; Gard. Chron. 3rd Ser. 1893, xiv. p. 35, f. 11 ; C. P. 121.

**5. L. Teretifolia**, Gaud. Bot. Freyc. Voy. 427, t. 37.

Flowers small, lateral sepals subacute keel winged, petals linear-oblong obtuse hardly longer than the sepals, hypochile subquadrate saccate, epichile broadly cordate.

Pegu and Tenasserim, *Griffith, &c.*

*Stem* 6—12 in., stout; internodes  $\frac{1}{2}$ — $\frac{3}{4}$  in. *Leaves* variable in thickness. *Rachis of spike*  $\frac{1}{6}$ — $\frac{1}{3}$  in. *Petals*  $\frac{1}{6}$ — $\frac{1}{4}$  in. long. *Lip* equalling or rather exceeding the sepals. *Column* very short. *Capsule*  $\frac{3}{4}$ — $1\frac{1}{2}$  in. Blume erred in referring Willdenow's *Cymb. triste* to Gaudichaud's *Luisia teretifolia*; it is *Luisia tristis* (non-Burman). *Hook. f.* Fl. Brit. Ind. vi, 22.

Blume Rumph. i. t. 194, f. 3, t. 197D; Mus. Bot. i. 63; Lindl. Fol. Orchid. 2 (excl. in all Syn. *Ep. triste*).

SYN.—*L. burmanica*, Lindl. l. c.

*L. brachystachis*, Var. *flaviola*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 144. Flowers yellow, the hypochile purple and epichile streaked with purple. *Hook. f.*

*L. platyglossa*, Rchb. f. in Walp. Ann. vi. 622; C. P. 44.

*L. Zeylanica*, Lindl. l. c.

*Cymbidium triste*, Roxb. Fl. Ind. iii. 461 (not of Willd.); Bot. Mag. t. 3648; Wight Ic. v. 11 (text, not Ic.); Griff. Notul. iii. 340 (the Mergui plant).

*C. tenuifolium*, Wight. l. c. t. 1689 (Ic., not text).

## KEY TO SPECIES.

### LUISIA,\* Gaud.

Tufted epiphytes; stem terete, rigid, sheathed, pseudobulbs O. *Leaves* elongate, terete, obtuse. *Flowers* drooping, small, spicate on a short or very stout erect axillary rachis; bracts very short, thick, imbricating, persistent. *Sepals* subequal or the decurved dorsal smaller. *Petals* often longer, narrower. *Lip* sessile on the base of the column, base flat concave or saccate. *Column* very short, truncate; anther 2-celled; pollinia 2, subglobose, seated on a replicate short strap. *Capsules* narrow, erect.

The materials at my disposal for the elucidation of this remarkable

\* See Appendix A, Genus 49.

genus are, though considerable, far from being sufficient. Above all, careful drawings from living plants should be obtained, when the following attempt at diagnosing the Indian species will want revision and probably correction.

\* Petals not much longer than the lateral sepals (most so in *L. primulina*).

No. 5, *L. teretifolia*; No. 2, *L. brachystachys*; No. 3, *E. primulina*.

\* \* Petals much longer than the sepals.

No. 4, *L. Psyche*.

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#### DIPLOPRORA,\* Hook. f.

Stem slender, short. Leaves falcately lanceolate, acuminate. *Scape* short, simple, few-fl'd. *Sepals* widely spreading, keeled. *Petals* obovate. *Lip* as long as the petals, margins adnate to the sides of the column, cymbiform and sigmoidly curved, suddenly narrowed into a compressed 2-caudate tip, disk keeled. *Column* very short, foot O; anther 2-celled, pollinia 2, globose; strap short linear, sides recurved; glands small. Capsule slender. Hook. f.

#### 1. *D. Championi*, Hook. f.; Ic. Pl. Ined.

*Stem* 1—3 in., ascending. *Leaves* 3—4 in. by  $\frac{1}{2}$ — $\frac{3}{4}$  in., thin and many-nerved when dry. *Scape* 1—2 in., stout; rachis flexuous; flowers few,  $\frac{1}{2}$  in. diam., yellow; lip with a deep longitudinal ridge within, sides streaked with red; column papillose. *Capsule*  $1\frac{1}{2}$  in. Very distinct from *Cottonia* in habit, foliage, inflorescence and lip, and much nearer *Phalænopsis*, but wants the appendages on the disk of the lip and the side lobes, and differs strikingly in habit. Hook. f. Fl. Brit. Ind. vi. 26.

Tenasserim, *Parish*.

A small plant with fleshy, ovate, pointed leaves, and a few flowers, 5 or 6, on a rigid leaf-opposed stalk, 4—5 in. long. Sepals and petals

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See Appendix A, Genus 50/1.

ovate, broad, nearly equal, spreading. Column short. Lip 3-lobed, connate with the base of the column lateral lobes quadrately rounded, midlobe projecting at right-angles with them and tapering to a finely forked extremity. At the back of the lip, between the lateral lobes, is a large cushion-like oval callus, and there is also a "hump" on the midlobe. The only other known habitat of this plant is Hong Kong. The flowers  $\frac{3}{4}$  in. across, dingy yellow, with a white and purple lip.

*Parish.*

SYN.—*Cottonia Championi*, Lindl. in Hook. Journ. Bot. vii. (1856) 35; in Journ. Linn. Soc. iii. 39; Benth. Fl. Honk. 357; C. P. 277.

*Luisia bicaudata*, Thwaites Enum. 302.

*Vanda bicaudata*, Thwaites l. c. 429.

### TRICHOGLOTTIS. Blume.

A small genus of Vanda-like habit. Leaves long, distichous. Flower-stalks axillary or leaf opposed, few-flowered. Pollen-masses 2, stipes narrow, gland broad, peltate. *Parish.*

A small genus of epiphytal orchids, with elongate leafy stems, distichous leaves, and lateral peduncles bearing few-flowered short racemes, or sometimes solitary flowers. The group is closely allied to "*Sarcochilus*" from which it differs mainly in not having a fleshy lip. The species, of which about half a dozen are known, inhabit the Malayan Archipelago. *Williams.*

1. **T. Dawsoniana.** R. fil. in Gard. Chron. 1872, p. 699.

Flowers paniced pale green spotted with brown or purple, sepals and petals cuspidate on the back below the concave tip, lip saccate at the base tip 2-fid.

Tenasserim; at Moulmein. *Parish.*

*Stem* 1—2 ft., stout, rooting. *Leaves* few 3—6 by  $\frac{3}{4}$ —1 in. *Panicle* 18 in., erect, stiff, branches spreading; bracts broadly ovate; pedicel

with ovary  $\frac{1}{2}$  in. ; flowers 1—1½ in. diam. ; anther 2-lobed, crested ; *pollinia* large, strap short slender. *Hook. f.* in Fl. Brit. Ind. vi. 43.

C. P. 163 and 179.

SYN.—*Cleisostoma Dawsoniana* Rehb. f. in Gard. Chron. 1868, 815.

## KEY TO SPECIES.

### TRICHOGLOTTIS,\* Blume.

Epiphytes ; stems elongate leafy. *Leaves* distichous, flat, narrow. *Flowers* in branched panicles or solitary or few in very short racemes. *Sepals* and *petals* widely spreading oblanceolate or subspathulate. *Lip* adnate to the sides of the very short column, narrow, base saccate or spurred ; side lobes one or two pairs of narrow processes ; midlobe straight or decurved from the middle, hairy. *Column* very short, sides produced into 2 spurs or horns ; anther incompletely 2-celled ; *pollinia* 2, globose, strap rather short, gland moderate.

In the absence of good material, I am doubtful as to the correctness of the above definition of *Trichoglottis*. Bentham refers Blume's *T. retusa* to *Saccolabium* ; and by replacing that author's character of "lip adnate to the whole length of the column with a process on each side," by "lip adnate to the foot of the column and forming with it a long horizontal spur-like mentum," and omitting that of a hairy lip, he excludes the others. I am disposed to regard the hairy lipped species figured by Blume in his *Bijdragen* (*T. retusa*, 360, f. viii) as the type of the genus. That this is Kurz's and Reichenbach's view appears from the plants they have referred to it. In this case *Trichoglottis* is referable to the group with no foot to the column. There are amongst *Scortechini's* drawings of Perak orchids, one or two that are referable to this genus, but the analyses are insufficient.

### PHALÆNOPSIS. Blume.

The known species are all compact handsome plants, without pseudobulbs, but emitting stout fleshy roots from the crown, and also

\* See Appendix A, Genus 57.

producing very thick distichous leaves, from the axils of which the scapes arise. The flowers are showy, with spreading sepals, much broader petals, contracted at the base and continuous with the column, the disk and base of the lamina variously appendiculate. The flowers are freely produced and last a long time. There are two sections—" *Euphalaenopsis*," in which the petals are much broader than the sepals, and the apex of the lip is emarginate or divided into 2 divaricate or cirrhiferous lobes; and " *Stamoglottis*" in which the sepals and petals are similar, and the tip of the lip entire. The species number over 2 dozen and are found in the Malay Archipelago, and in the eastern provinces of India. They require a certain amount of care in their treatment and plenty of water at the roots when growing, *i.e.*, from March to October.

They should be shaded from the direct rays of the sun. They succeed well, grown either on blocks, in pots, or in baskets, good drainage being essential.

These plants are difficult to propagate as they supply few opportunities for division. Sometimes some species will produce young plants on the old flower-stems, or upon the roots; when this happens they should be left on until well rooted, and then placed on small blocks.  
*Williams.*

Sepals and petals spreading, free. Lip connate with the slightly produced base of the column, free, bilobed, attached by a strap-shaped stipes to a heart-shaped gland. Stemless epiphytes, generally with 2—3, sometimes 4 leaves, which are large, broad and fleshy. Flowers-stem from the short axis of the plant, 1 or more. Flowers large and showy.  
*Parish.*

***Phalaenopsis antennifera***—see *P. Esmeralda*.

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1. ***P. cornu-cervi***, Par. and Rchb. f. in Hamb. Gartenz. 1860, 116; C. P. 54.

A very pretty bulbless orchid, not showy, but blooms very freely when vigorous. The leaves are distichous, leathery, cuneate-oblong 8 in. or more in length and of a bright green colour. The peduncles are lateral erect, clavate, flattened out towards the apex, where from 6—12



flowers are produced in succession ; the dorsal sepal is narrow lanceolate, the lateral ones slightly falcate, the former greenish-yellow cross-barred with reddish brown, and having a wider blotch at the base ; the latter with the outer halves only barred with brown ; the petals are somewhat smaller, greenish yellow, with crossbars of brown ; the lip is whitish clawed, and hollowed out on the disk, and incurved tripartite ; the lateral divisions bluntly oblong, the intermediate ones crescent-shaped and apiculate. Moulmein. *Williams*.

Scape 6—10 in., flowers 2 in. diam. yellow-green barred with brown. *Leaves* 3—8 in., oblanceolate. *Scape* stout, simple or branched ; rachis 3—5 in., bracts 1/4 in., oblong tip rounded ; sepals oblong lanceolate ; petals shorter ; lip subsessile, side lobes oblong, middle ovate acute with a short falcate wing on each side of the tip ; disk with a broad 2-awned plate at the base, and a flattened sword-shaped compressed spur in front of it. Habit of a "*Sarcochilus*." *Hook. f. Fl. Brit. Ind. vi. 29.*

Tenasserim, at Moulmein, *Lobb. Parish*.

Rolfe in Gard. Chron. 1886, ii. 276 ; Batem. 2nd. Cent. Orch. Pl. t. 178 ; Kuhl. and Hasselt, Gen. and Sp. Orch. t. 1.

SYN.—*Polychilus cornu-cervi*, Breda Orch. Jav. t. 1 ; Bot. Mag. 5570.

## 2. *P. Esmeralda*, Rchb. f. in Gard. Chron. 1774, ii. 582.

Lateral sepals orbicular-ovate, petals broadly ovate, claw of lip long geniculate with two narrow recurved auricles, side lobes broadly falcately obovate, midlobe oblong.

Burma, *Hort. Low*.

*Leaves* 4—6 in. *Scape* 1—2 ft., simple or branched, slender ; rachis elongate ; flowers 1 in. diam., amethystine ; side lobes of lip erect, appressed, red purple ; disk with a 2-awned callus in front of the auricles, and a raised thickened fleshy ridge from the base of the side lobes to the tip of the midlobe. *Hook. f. Fl. Brit. Ind. vi. 31.*

Rev. Hort. 1877, t. 107 ; Warner Orch. Alb. vii. t. 21 ; Floral Mag. N. S. t. 358 ; Rolfe in Gard. Chron. 1886. ii. 276 ; Orchidoph. 1881 t. 9 ; Bot. Mag. t. 7196. Floral Mag. 2nd Ser. t. 358 ; Lindenia vi. t. 263 (Var. *candidula*).

SYN.—*P. antennifera*, Rchb. f. in Gard. Chron. 1878, 398 ; 1882, 520 ; Rolfe l. c. 1886, 11. 276.

In *P. antennifera* the flowers grow on scapes upwards of 2 ft. long ; sepals and petals light rose-coloured, the tips of the sepals brick red outside, unguiculate lip 3-fid, the side laciniae and basilar antennae deep orange striped with red, and the anterior lobe amethyst. Blooms in September and October. *Williams*.

*P. Regnieriana*, Williams Man.

3. *P. Lowii*, Rchb. f. in Bot. Zeit. 1862, 214 ; in Gard. Chron. 1862, 979 ; Xen. Orch. ii. t. 151.

This charming species forms a tuft of a few oblong acute fleshy bright green leaves, from the base of which very stout fibrous roots are produced, as well as the slender lateral 4—5-fid. purplish scape.

Flowers about  $1\frac{1}{2}$  in. diam. with ovate acute dorsal and oblong lateral sepals, broad roundish cuneate petals, and a small 3-lobed lip about as long as the lateral sepals, the side lobes of which are linear and reflexed, and the intermediate one oblong ascending, rich violet-purple, the bases of the white sepals and petals flushed with pale purple, as are the lateral lobes of the lip and the long proboscis-like rostellum on the tip of the column. Though a small plant it produces a good spike of flowers. It grows on bare rocks exposed to the full influence of the sun, where in the rainy season it is deluged with water. It loses its leaves in the resting season and blooms in summer. *Williams*.

This plant loses all its leaves in its native habitat directly after flowering. It grows on limestone rocks, and on the branches of small bushes growing in the crevices of the rocks. The ranges of limestone hills on which it is found, rise suddenly out of the delta of the rivers Gyne, Ataran, and Salween, Tenasserim, Burma. The country surrounding these hills is under water the greater part of the year, and the rainfall is excessive. The roots cease to grow, but are kept plump by the heavy dews which fall at night. The resting season is short, as showers fall in March, when the plant at once begins to put forth fresh leaves. *Berkeley* in Gard. Chron. 1887. ii. p. 745, f. 146.

Petals fan-shaped very much larger than the oblong sepals, rostellum much longer than the column.

*Leaves* 3—5 in., ovate-oblong or lanceolate, acute. *Scape* with lax-fld raceme 10—24 in., slender, simple or branched; flowers  $1\frac{1}{4}$ —2 in. diam., sepals white, dorsal largest and broadest; petals flushed with violet towards the base; lip sessile, as long as the lateral sepals, narrowly oblong, side lobes small, uncinately recurved yellow, midlobe obcuneately oblong truncate and crenate at the tip purple; disk keeled and furnished with a transverse forked plicate callus at the base of the side lobes in front, and with some soft spines behind; column and rostellum pale purple. *Hook. f. Fl. Brit. Ind.* vi. 30.

Tenasserim; at Moulmein, *Parish*.

*Bot. Mag.* t. 5351; *Fl. des Serres*, t. 1910; *Warner Sel. Orch. Ser.* 2, t. 15; *Rolfe in Gard. Chron.* 1886, ii. 276; *Lindenia* vi. t. 272; *Veitch Man. Orchid.* vii. 29; *Batem. 2nd. Cent. Orch. Pl.* t. 168; *C. P.* 125.

SYN—*P. proboscidioides*, *Williams Orchid. Man.*

4. *P. Parishii*, *Rchb. f. in Gard. Chron.* 1865, 410; 1871, 802; *Xen. Orch.* i. 144, t. 156, f. 1.

A lovely little plant with thick fleshy roots, distichous tufts of oblong-lanceolate acute deep green leathery leaves from 2—4 in. long, and short 6—10-fld. racemes, the flowers less than an inch in diam., but with their parts well spread out. The sepals are oblong-ovate, the petals ovate-spathulate, both white, and the lip has the lateral lobes small, horn like, yellow with purple blotches, and the front lobe broadly triangular spread out, and of a rich deep amethyst purple; the disk has a semi-lunar callus the edge of which is broken up into a fimbriate crest, and behind this is a projecting linear appendage divided into slender filaments almost as long as the lobe itself. The strong contrast of colour in the rather crowded flowers render the plant very beautiful when in bloom, which occurs during the summer season. *Burma. Parish*.

This plant, a native of Moulmein, loses its leaves during the dry weather, in moist localities. If the rains set in late, before the leaves get a fair start, it is not unusual to see the plant in flower before the

leaves develope. It is generally found on boughs of trees covered with moss, where it is subject to great heat and moisture during the growing season. In cultivation, it will retain its leaves throughout the winter if the moss at the roots is kept slightly damp (not wet) during the resting season. *Berkeley*, in Gard. Chron. 1887.

Flowers small, lateral sepals subrotund, lip short sessile, side lobes small falcate, midlobe much broader shortly stipitate reniformly cordate. *Leaves* 3—5 in., linear or obovate-oblong. *Scape* 3—4 in., 6—8 fld.; flowers  $\frac{3}{4}$  in. diam.; sepals and obovate petals cream coloured; lip mobile, purple-brown; disk with a narrow 4-awned appendage at the base overlapping a much broader ciliate lamina; rostellum 3-partite. *Hook. f.* Fl. Brit. Ind. vi. 31.

Tenasserim, *Lobb.* Eastern Himalaya, *Lobb. Mann.* Cachar, *Keenan.* Bot. Mag. t. 5815; Rolfe. in Gard. Chron. 1886, ii. 276; C. P. 110.

Var. *Lobbii*. Rchb. f. in Saunders Refug. Bot. t. 85.

Has a white lip with two chestnut bands. *Hook. f. l. c.*

**5. *P. speciosa***, Rchb. f. in Gard. Chron. 1881. i. 562; 1882 ii. 744. fig. 130—132.

It has large yellowish-green cuneate-oblong obtusely-acute leaves, and racemes or panicles of elegant stellate flowers, which are very freely produced. The sepals and petals are whitish-rose outside with rows of purple blotches, purple inside with a few white bars at the base of the petals, the side lobes of the lip yellow, white at the top and base, the midlobe white and rosy-purple, or wholly purple, with a tuft of hairs at the apex. This species seems to vary a good deal, some of the varieties having the blossoms much blotched and showing very little white. *Williams.*

This plant does not grow in the mangrove swamps, but on large trees, fully exposed to the air; this will probably account for its being more robust. It can in cultivation stand a great deal more light than *P. tetraspis*, probably as much as any of the other *Phalanopsis*. *Berkeley* in Gard. Chron. 1887.

Sepals elliptic-lanceolate acute, petals similar but smaller, lip sessile,

side lobes small linear-oblong truncate toothed, midlobe laterally compressed fleshy, tip dilated mallet-like papillose.

*Leaves* 8—12 in., obovate-oblong or lanceolate. *Scape* tall, simple- or branched; flowers 2 in. diam., scattered, white or rosy with darker blotches; lip with a forked callus; column long, tip toothed, foot very short; pollinia oblong. *Hook. f.* Fl. Brit. Ind. vi. 30.

Andaman Islands. *Berkeley.*

Warner Orch. Alb. t. 158; Gard. Chron. 1882, ii. 745, f. 130—132; 1886, ii. 277, fig. 56—58; Reichenbachia, ii. t. 57; Rolfe. in Gard. Chron. 1886, ii. 277; Lindenia, vi. t. 288; Veitch. Man. Orchid. Pl. vii. p. 38.

Var. *Christiana* Rchb. f. has rose-madder sepals and white petals. *Hook. f.*

Fig. Gard. Chron. N. S. 1886, xxvi. p. 277, f. 57.

Var. *purpurata*, Rchb. f. has rose-purple flowers. *Hook. f.*

Var. *Imperatrix*, Rchb. f.

This variety is said to have larger flowers than the type, of a deep rosy-purple colour. *Williams.* Perhaps *purpurata*? *B. G.*

6. *P. tetraspis*, Rchb. f. Xen. Orch. ii. 146; in Gard. Chron. 1881, ii. 562, 656.

Flowers as in *P. Speciosa*, but waxy white with 2 2-awned basal calli on the hairy disk.

*Leaves* 12 by 2—4 in. cuneately obovate. *Scape* tall, stout, branched. I have seen no flower of this. *Hook. f.* in Fl. Brit. Ind. vi. 30.

The flowers are said to have a fine perfume. *Williams.*

This plant grows in mangrove and other trees, in very muddy swamps; it is never found growing under any other conditions; it is only found on trees at the extreme end of the creeks, where the water is sweet; the plant is found hanging from the branches a few feet above the water; here it grows with the most extraordinary luxuriance; it may be said to grow in a continual vapour bath, and as the swamps

have a very obnoxious smell it is no doubt supplied with many chemical compositions which enhance its growth. *Berkeley* in Gard. Chron. 1887.

Andaman Islands, *Col. Man.*

Rolfe in Gard. Chron. 1886, ii. 277. Bot. Mag. t. 7321.

**P. Wightii**, see *Doritis Wightii*.

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### KEY TO SPECIES.

PHALÆNOPSIS,\* Blume.

Epiphytes, stem short, leafy; pseudobulb O. *Leaves* distichous coriaceous. *Scape* lateral; flowers usually large, loosely racemed. *Sepals* widely spreading. *Petals* narrower or broader. *Lip* clawed or sessile, adnate to the base or the foot of the column, side lobes erect, midlobe various, spur O; disk variously appendaged, with usually a forked plate or callus. *Column* suberect, foot long short or O; anther 2-celled; pollinia 2, sulcate or 2-partite, strap linear or spatulate, gland large or small. The genus requires revision, and a careful examination of the lip, which is very imperfectly figured and described by the authors who have had access to living specimens.

\* Lateral sepals inserted by a narrow base to the base or very short foot of the column.

† *Rachis* of raceme compressed; bracts fleshy, distichous.

No. 7. *P. cornucervi*.

†† *Rachis* of raceme terete.

No. 3, *P. Louii*; No. 5, *P. speciosa*; No. 6, *P. tetraspis*.

\* \* Lateral sepals inserted by a broad base on the elongate foot of the column.

No. 2, *P. esmeralda*; No. 4, *P. Parishii*.

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\* See Appendix A, Genus 53.

**DORITIS,\*** Lindley.

Characters of *Phalænopsis* and having the same 2-awned plate on the disk of the lip, but the column is narrowly winged, its foot longer forming a spur-like mentum with the side lobes of the lip. Hook. f.

1. **D. tænealis**, Benth. in Gen. Plant. iii. 574.

Scape short few-fl., mentum acute, side lobes of lip very narrow, spathulate reflexed on the disk, tips of the forked appendage of the lip hooked.

Burma.

*Roots* 1—3 ft., flat,  $\frac{1}{8}$  to  $\frac{1}{3}$  in. broad, forming large tortuous tufts. *Leaves* few, 3—5 in., obovate-oblong, obtuse or subacute, narrowed to the sessile base, soft when dry. *Scape* 1—2 in.; bracts small broad; *flowers*  $\frac{2}{3}$  in., diam., mauve purple; midlobe of lip dark red or purple. *Capsule*  $1\frac{1}{2}$  in., fusiform. Hook. f. Fl. Brit. Ind. vi. 32.

SYN.—*Ærides tæniale*, Lindl. Gen. and Sp. 239; in Journ. Linn. Soc. iii. 41.

*Æ. carnosum*, Griff. Notul. iii. 363; Ic. Pl. Asiat. t. 338A.

2. **D. Wightii**, Benth. in Gen. Plant. iii. 574.

Scape elongate simple or branched, sidelobes of spreading lip broad cuneate-obovate, midlobe obcordate.

Burma; Moulmein, *Parish*, Mongong, *Griffith*.

Habit of *D. tænalis*, but leaves rather larger, scape much longer, and lip very different. Hook. f. Fl. Brit. Ind. vi. 32.

SYN.—*Phalænopsis Wightii*, Rchb. in Bot. Zeit. 1862, 214; C. P. 175. *Ærides latifolium*, Thwaites Enum. 430.

**VANDA.** R. Brown.

This genus contains some of the most magnificent orchids of which the Eastern Hemisphere can boast. Not a few are of very large size.

\* See Appendix A, Genus 54.

They are all epiphytal, and have distichous leaves, which are often thick and leathery, and more or less strap-shaped. The flowers are borne in lateral, erect or pendulous racemes. The sepals and petals are wide-spreading and resemble each other. The lip is saccate or spurred, and fleshy, entire, or 3-lobed, continuous with the base of the column. Column short, thick. Pollen-masses 2, bilobed, attached by a more or less wedge-shaped stipes to a larger roundish or subtriangular gland. *Vanda*, according to Sir William Jones, is the Hindoo name for *V. Roxburghii*, the original species. *Parish*.

They require the same treatment as *Ærides*, except that they require but little shade. Propagation is effected by taking off the young growths which spring from near the base of the stem, or by cutting the stem as directed in the case of *Ærides*. *Williams*.

### 1. *V. Amesiana*, Rchb. f.

First imported with a quantity of other orchids from India. It is a dwarf-growing evergreen and free-flowering species, producing distichous ligulate acute deep green leaves; the scape is erect carrying numerous delicately coloured and very fragrant flowers; sepals and petals nearly equal, flat and spreading, white suffused with a delicate blush; lip deep rose, margined with pale rose. It was dedicated to the late Hon. F. L. Ames, of North Easton, U. S. A. The flowers which are produced in May and June, last several weeks in beauty. *Shan States, Williams*.

Orchid Alb. vi. t. 296; Bot. Mag. t. 7139; Journ. of Hort. 1889. xviii. p. 103, f. 18.

Var. *Alba*. Hort.

Has pure white flowers. *Williams*.

### 2. *Bensoni*, Batem. in Bot. Mag. t. 5611.

Flowers about 2 in. in diam., white on the outside, the sepals and the smaller petals obovate, obtuse, yellowish green, dotted, not tessellated, with reddish brown on the inside, and the lip ovate in front, is convex, trilamellate on the disk, pink, with a kidney-shaped bi-fid violet-cold apex, the small basal auricles and conical spur white. *Williams*.



Leaves narrow, peduncle tall inclined many-fl'd., flowers  $1\frac{1}{2}$ —2 in. diam., sepals and petals dull yellow-green spotted with red-brown, lateral sepals broadly obovate, petals spathulately obovate, lip nearly as long as the sepals, blue, side lobes triangular-ovate, much smaller than the panduriform midlobe which has 2 broad recurved terminal lobes.

*Stem short.* *Leaves* 4—6 in. obliquely truncate and toothed. *Peduncle* with the raceme 18 in. ; midlobe of lip with 4 obtuse ridges ; spur conical obtuse. Very near *V. Denisoniana*, but flowers much smaller, quite different in colour, not so waved, midlobe of lip more contracted, the terminal lobes uncinatè.

A form with brown flowers figured by Parish and called *tristis*, it may be this or *V. brunnea* ; q. v. *Hook. f. Fl. Brit. Ind.* vi. 51.

Pegu ; near Rangoon, *Benson*. Tenasserim ; at Moulmein, *Parish*. *Rchb. f. Xen. Orchid.* ii. 138 ; *Gard. Chron.* 1867, 180 ; *Fl. des Serres*, t. 2329 ; *Batem. 2nd. Cent. Orchid. Pl.* t. 192 ; *C. P.* 204.

### 3. *V. brunnea*, *Rchb. f. Xen. Orchid.* ii. 139.

Leaves long narrowly ligulate emarginate, flowers as large as in *V. concolor* (of China) olive within, sepals and petals cuneately oblong obtusely acute, lip and column pale yellowish white, side lobes semi-rotund, midlobe ligulate 2-lobed retuse, spur acutely conical.

Moulmein, *Parish*.

There is a drawing at Kew by Parish of what may be this species named *V. tristis*, *Par. MSS.*, the perianth is brown on both surfaces, the lip and column pale brown. (See *V. Bensoni*.) *Hook. f. Fl. Brit. Ind.* vi. 54. (Among species unknown to him.)

### 4. *V. cœrulea*, *Griff. ex. Lindl. in Bot. Reg.* 1847, sub. t. 30 ; *Fol. Orchid.* 8.

The erect scapes are much longer than the leaves, and bear dense racemes of 10—15 flowers, or more, the flowers 5 in. across, with the membranaceous sepals and petals flat oblong blunt, and shortly stalked, of a beautiful pallid blue, and the small lip linear-oblong leathery, deep blue, the point blunt with 2 diverging lobes ; the spur is short and blunt

and the disk bears 3 lamellæ. The flowers are produced during the autumn months, and last six weeks in perfection. *Williams.*

Peduncle elongate many-fld., flowers 3—4 in. diam. pale blue, lateral sepals obovate, petals clawed broadly obovate, lip much shorter than the sepals dark blue linear-oblong, side lobes small rounded, midlobe with 2 thickened ridges ending in a bi-gibbous tip.

*Stem* 3—6 in., very stout. *Leaves* 3—10 by  $\frac{3}{4}$ —1 in., keeled, 2-lobed or tip obliquely truncate and toothed. *Peduncle* with lax-fld. 6—20-fld. raceme 1—2 ft., perianth segments somewhat waved and obscurely tessellate; lip not  $\frac{1}{3}$  the length of the sepals; spur conical obtuse. *Capsule* 3 in., fusiform, long pedicelled. *Hook. f. Fl. Brit. Ind. vi. 51.*

Khasia and Jyntea Mts., on Oaks, alt. 4000 ft. *Griffith, &c. Burma, Rangoon Agri-Hortic. Society's Collectors.*

*Paxt. Fl. Gard. t. 36; Jard. Fleurist. t. 102; Fl. des Serres. t. 609; Rchb. f. Xen. Orchid. i. 8, t. 5; Pescatorea, i. t. 29; Ill. Hortic. vii. t. 246; Warner Sel. Orchid. t. 18; Jennings Orchid. t. 34; Reichenbachia ii. 19, t. 57; Lindenia, iv. t. 160; Moore, Ill. Orch. Pl. (Vanda), t. 2; Puydt, Les Orchid. t. 45; L'Hort. Franc. 1862, t. 1; L'Orchidophile, 1890, p. 369; Gartenfl. 1890, t. 1332; Rev. Hort. Belg. 1891, p. 165, t. 21; Veitch Man. Orchid. Pl. vii. p. 91; Orchid Alb. vi. t. 282.*

*SYN.—V. coerulescens, Journ. Hort. Soc. vi., Proc. vii. with fig. Vanda, Griff. Itin. Notes, 88, No. 1284.*

##### 5. *V. coerulescens*, Griff. Not. iii. 352; Ic. Plant. Asiat. t. 331.

Raceme drooping, flowers 1—1½ in. diam., sepals obovate and spathulate, petals pale blue, lip rather shorter than the sepals, midlobe cuneate-obovate with a dilated truncate 2-lobed tip, disk with fleshy dark blue ridges, spur slender conical half as long as the lip.

Upper Burma, *Griffith*, Pegu; on hills near Prome, alt. 1500 ft. *Benson.*

*Stem* 6 in. *Leaves* 6—10 by  $\frac{3}{4}$  in., much broader in cultivation, acutely 2-fid or 3-fid. *Peduncle* with racemes 1 ft. or less; pedicel with ovary 1—1½ in.; flowers variable in colour, from blue to nearly white (Vars. *Boxallii* R. f. and *Louriana*, R. f.); spur and column blue. *Hook f. Fl. Brit. Ind. vi. 50.*

The scapes are slender, axillary, erect, bearing from ten to twenty flowers. Blooms in March and April lasting a long time in perfection. *Williams.*

Lindl. Fol. Orchid. 9; Walp. Ann. vi. 868; Bot. Mag. t. 5834 and 6328; Warn. Orchid. Alb. t. 48; Floral Mag. N. S. t. 256; Orchidoph. 1863, t. 657; Rchb. f. in Gard. Chron. 1869, 498; 1870, 529, f. 96; C. P. 335.

Var. *Boxallii*, Rchb. f. in Gard. Chron. 1877, 749.

A curious and charming form in which the leaves are rigidly distichous, strongly keeled, obliquely erose at the apex, and the flowers form a rather close raceme on a comparatively short scape. The flowers are white and blue, and very effective, the obtuse and retuse sepals and petals being white with a tinge of lilac, and the lip with its dilated front lobe deep violet bordered with white; the disk bears some smooth longitudinal ridges, with dark blue stripes alternating with white ones. *Williams.*

Fig. Bot. Mag. t. 6328; C. P. 372.

6. **V. Denisoniana**, Benson and Rchb. f. in Gard. Chron. 1869 (? 1868), 528; 1885, 105, f. 21.

A very chaste and desirable species, the first white *Vanda* which has yet been discovered. In its habit of growth it much resembles *V. Bensoni*, but the foliage is longer and broader.

The racemes are axillary, 5—6-fl., on stout ascending peduncles, while the flowers themselves are medium sized, thick and fleshy, the oblong spatulate dorsal sepal, and the broadly ovate lateral ones, as well as the spatulate petals, being white slightly tinged with green, the lip being also white, pandurate, the apex bilobed, with the lobes divaricate like the tip of a blackcock's tail, the base with 2 subquadrate auricles; spur short and conical. *Williams.*

Peduncle very short, flowers 2 in. diam., white, sepals and petals waved and twisted, lateral sepals largest broadly obovate falcate deflexed, petals clawed spatulate, lip longer than the sepals, side lobes large

subquadrate, midlobe panduriform with two orbicular diverging and recurved terminal lobes.

*Stem* short. *Leaves* 6—10 in., deeply unequally 2-lobed. *Peduncle* stout, with raceme 6—10 in.; pedicels with ovary 2 in.; midlobe of lip with rounded sides, and a very acute terminal sinus; disk with 5 thick obtuse ridges; side lobes concave, with orange streaks; spur short, villous within. *Capsule* 3—5 in., clavately fusiform. *Hook. f. Fl. Brit. Ind. vi. 51.*

Arracan, *Benson*. *V. Denisoniana* I have found on Ta-ok, but I do not know where Col. Benson found it. *Parish*.

Bot. Mag. t. 5811; Ill. Hort. N. S. t. 105; *Lindenia*, t. 21; Warner Orchid. Alb. t. 248 C. P. 294.

Var. *hebraica*, Rchb. f.

A new variety in which the sepals and petals are sulphur-colored on both sides, where they are covered with numerous spots and transverse short bars, somewhat resembling Hebrew characters; spur orange inside; anterior part of the blade of the lip olive green. Flowers in July. Burma. *Williams*.

Fig. Orchid Alb. vi. t. 284.

**7. *V. densiflora***, Lindl. in Paxt. Fl. Gard. sub. t. 42; Fol. Orchid. 2.

Leaves truncately excised, lip cuneate, tip shortly obtusely 3-lobed, base with 2 pubescent ridges descending into the spur.

Pegu; at Prome, *Wallich*. Rangoon, *Benson*.

*Stem* short, as thick as a child's wrist; roots  $\frac{1}{2}$ — $\frac{3}{4}$  in. diam. *Leaves* imbricating at the base, 6—12 by  $1\frac{1}{2}$ —2 in., very thick, channelled, lobes acute. *Peduncle* very short, stout; raceme 8—14 in., cylindric, very dense-fl.; flowers 1— $1\frac{1}{4}$  in. diam., white with a few purple spots at the base of the petals; lip fleshy, white with bright purple shining terminal lobes; spur short, inflated, pointing backwards. *Hook. f. Fl. Brit. Ind. vi. 53.*

Fl. des Serres, t. 1765; Rchb. f. in Gard. Chron. 1866, 1194.

SYN.—*Saccolabium giganteum*, Lindl. in Wall. Cat. 7306; Gen. and

Sp. 221 ; Bot. Mag. t. 5635 ; Reichenbachia t. 22 ; Jennings Orchid. t. 8 ; Lindenia f. 683 ; Orchdoph. 1888, t. 163 ; Warner Orchid. Alb. ii. t. 56 ; Veitch Man. Orchid. vii. p. 114 ; C. P. 83.

A species not to be confounded with any other when once seen.

Leaves very broad, 2—3 in., fleshy, streaked, 1 ft. or more long, unequally bilobed. Stem simple or branched, short and stout, sending out thick fleshy roots. Flowers in dense drooping racemes, very numerous, moderately sized, white with a purple lip, and a few lilac spots on the petals. The lip is flat, turned upwards, and has 3 lobe-like divisions at the end. It requires much room and is of extremely slow growth. Abundant about T'oungoo and elsewhere in the north of Burma, but not found, I believe, in the Tenasserim Provinces. *Parish.*

**V. gigantea**, see *Stauroopsis gigantensi*.

#### 8. **V. Kimballiana**, Rchb. f.

Undoubtedly this is one the handsomest *Vandas*, and was originally found by Mr. Boxall in Upper Burma. It is of slender habit, producing very narrow subulate leaves, tapering to a point, 7 or 8 in. long ; scapes nodding, 12—18 in. long, bearing 12 or more handsome flowers measuring 2 in. across ; upper sepal and petals narrow-oblong obtuse undulate at the margins, white suffused with delicate rose ; lateral sepals much larger, falcate, white suffused with pale rose towards the extremities ; lip 3-lobed, the side lobes small, bright yellow dotted with brown, the midlobe large cordate, deep rich rosy-purple. *Williams.*

Grows mostly on rocks, and in clusters, which break up into single plants on being pulled off. Like *V. Amesiana*, it likes the sun, and I have seen both species clinging to bare rocks in the full blaze, without any shade. *R. Moore.*

Fort Stedman, *R. Moore.*

The Garden, 1890, xxvii. p. 322. t. 747 ; Lindenia, v. t. 204 ; Bot. Mag. t. 7112 ; Gard. Chron. 3rd Ser. 1889, vi. 335. f. 50 ; Journ. of Hort. 1890, xx. p. 41, f. 6 ; Veitch Man. Orchid. vii. 90 ; Warn. Sel. Orchid. Pl. iii. t. 36.

**V. *Acampe longifolia***, see *Saccolabium longifolium*.

**9. V. *Parishii***, Veitch and Rchb. f. in Gard. Chron. 1867, 180. with fig.

A coarse-looking plant with a rather flattened stem and broad leathery but flabby leaves about 8 by 3 in. The flowers are borne in an erect raceme of 6—8 flowers, which are nearly as large as those of *V. gigantea*, and resemble them much in their markings. They are uniformly dotted with round spots of a red-brown colour on an orange ground. The column and base of the lip are white, and the somewhat triangular middle lobe is purplish-lilac. It has a delicious fragrance, resembling honey.

It is, I think, the freest and most rapid grower known to me, and very easy of cultivation. *Parish*.

Leaves broad obtusely 2-lobed, peduncle short stout erect, bracts large, flowers 2 in. diam., fleshy spotted mauve-brown or purple, lateral sepals broadly ovate-oblong and orbicular petals apiculate, lip half as long as the sepals, side lobes rounded, midlobe small cuneately flabelliform.

Tenasserim ; at Moulmein. *Parish*.

*Stem* very short, stout. *Leaves* few, 8—10 by 2—3 in. *Peduncle* very short ; raceme 6—8 in., drooping, 6—8-flid. ; bracts acuminate ; flowers variable in colour. The short stems and broad flat leaves are not those of *Vanda* proper, and more resemble *Stauroopsis* or *Arachnanthe*. *Hook. f.* Fl. Brit. Ind. vi. 51—52.

Rchb. f. Xenia, ii. p. 138 ; in Gard. Chron. 1870, p. 890 (? 800) ; Warner Orchid. Alb. t. 15 ; C. P. 178.

Var. *Marriottiana*, Rchb. f. in Gard. Chron. 1880, 743 ; and 1881, 726.

A very distinct and beautiful variety. A dwarf compact plant, with the short stems closely set with distichous ligulate-obtuse fleshy leaves, slightly and unequally emarginate ; the scape axillary, erect, bearing a raceme of about six handsome flowers, of which the sepals and petals, instead of being spotted as in the type, are bronzy-brown, richly suffused

with magenta, and the lip has white basal auricles, and a rich magenta rhomboid front lobe. The flowers are not scented. Moulmein. *Williams*.

Orchid Alb. ii. t. 61.

Var. *purpurea*, N. E. Br. in Gard. Chron. 1883, 307.

The sepals and petals are mauve-purple with white bases, and the lip bright mauve. *Hook. f. l. c.*

**10. *V. parviflora***, Lindl. in Bot. Reg. xxx. Misc. 45.

A beautiful little plant, quite distinct in character and resembling *Saccolabium curvifolium* in habit. The leaves are lorate, unequally bilobed with an intermediate cusp, and short erect racemes of pale yellow flowers, the broad oblong rounded front lobe of the lip white with purple crests on the fleshy disk, dotted with lilac; it blossoms during the summer months. *Williams*.

Peduncle and raceme strict erect,  $\frac{1}{2}$ — $\frac{2}{3}$  in. diam., sepals oblong and spatulate petals yellow, lip rather shorter than the sepals, midlobe cuneate-obovate with a dilated truncate 2-lobed tip, disk with fleshy blue ridges, spur slender conical half as long as the lip.

*Stem* 4—6 in. *Leaves* 4—8 by  $\frac{1}{2}$ — $\frac{3}{4}$  in., unequally obtusely 2-lobed. *Peduncle* and rachis stout; pedicel with ovary 1—1 $\frac{1}{2}$  in.; side lobes of lip small, ovate. *Capsule* 1—1 $\frac{1}{4}$  in., long pedicelled, clavate. *Hook. f. Fl. Brit. Ind.* vi 50.

Western Himalaya; Kumaon, Atakmunda river, alt. 3—4000 ft., *Edgeworth*. Nepal, *Wallich*. Assam, *Mann*. Burma, *Berkeley*. Western Peninsula; from the Concan to Travancore. Ceylon, *Walker, &c.*

*Wight, Ic.* t. 1669; *Rchb. f.* in Gard. Chron. 1877, 166.

*SYN.*—*Ærides Wightianum*, Lindl. in Wall. Cat. 7320; *Gen. and Sp.* 238; in Journ. Linn. Soc. iii. 40; *Bot. Mag.* t. 5138; *Wight, Ic.* v. p. 8; *Dalz. and Gibs. Bomb. Fl.* 265; *C. P.* 22 and 162.

Var. *albiflora*; sepals and petals white, lip white, ridges speckled with red, spur broader, obtuse. *Hook. f. l. c.*

Moulmein (*Ic. Parish*).

11. **V. Roxburghii**, Br. in Bot. Reg. t. 506.

Leaves præmorse, raceme suberect, flowers  $1\frac{1}{2}$ —2 in. diam., tessellated with brown, sepals and petals subequal clawed obovate waved, lip nearly as long as the sepals, side lobes small acute, midlobe panduriform violet tip dilated truncate 2-lobed.

Tenasserim, *Hook. f.*

*Stem* 1—2 ft., climbing. *Leaves* 6—8 in., narrow, complicate. *Peduncle* 6—8 in., 6—10-fl.; sepals and petals yellowish-green or blueish except from the clathrate-brown nerves, margins white; lip half as long as the sepals or more, disk of midlobe convex with fleshy ridges and white margins and mesial lines; spur conical.

Reichenbach in Gard. Chron. 1883, i. 9, describes a Var. *Wightiana*, with purple lip, the side lobes with more or less developed anterior teeth. The colouring in the Fl. des Serres, ii. t. 11, is unlike that of any form known to me. Roxburgh distinguish his *C. tessellatum* from his *C. tesselloides*, by the former having the lip with the sides incurved into a tube, and the blade tapering entire acute; whilst in the latter the lip is channelled above, concave underneath, and the tip of 2 obtuse lobes. The latter (the typical *V. Roxburghii*) is the only form known to Indian botanists, and I suspect that the form of the lip of *C. tessellatum* is due to withering. *Hook. f.* Fl. Brit. Ind. vi. 52—3.

Lindl. Gen. and Sp. 215. Fol. Orchid. 3; Wight. Ic. t. 916; Fl. des Serres ii. t. 11; Paxt. Fl. Gard. t. 42, f. 2; Rchb. Fl. Exot. t. 121; Ill. Hort. t. 185 (var.).

SYN.—*V. tesselloides*, Rchb. f. in Walp. Ann. vi. 864.

*Cymbid. tesselloides*, Roxb. Fl. Ind. iii. 463.

*C. tessellatum*, Swartz in Nov. Act. Upsal. vi. 75; Willd. Sp. Pl. iv. 102; Roxb. Fl. Ind. l. c.

*C. alagnata*, Herb. Ham.

*Epidendrum tessellatum*, Roxb. Cor. Pl. i. 34, t. 42.

*Arides tessellatum*, Wight in Wall. Cat. 7318; Lindl. Gen. and Sp. 240.

—Vanda, Jones in Asiat. Res. iv. 302.



Var. *concolor*, Bot. Mag. 3416.

*Leaves* distichous, obliquely and unequally toothed at the end. *Flower-spikes* erect, many-fl'd., longer than the leaves. Flowers distant, about 2 in. across. *Sepals* and *petals* unguiculate (clawed) obovate, obtuse. *Lip* about the same length as the sepals, with two small triangular rather blunt side lobes or auricles at its base, from in front of which it is ovate, convex, traversed by 3 lamellæ, and terminated by a kidney-shaped, broad, bifid apex. Flower of an uniform dull greenish brown colour on the inside, lip included, without any markings, and white on the outside. *Parish*.

C. P. 177.

Var. *unicolor* is I suspect the Chinese *V. concolor*, Blume *Hook. f. l. c.*

**12. V. teres**, Lindl. in Wall. Cat. 7324; Gen. and Sp. 217; Fol. Orchid. 7; in Bot. Reg. t. 1809.

This species differs widely from all the foregoing. Its leaves are terete, distant, few alternate 6—8 in. long. The racemes, which are few-fl'd., are opposite to a leaf, 6—12 in. long. The flowers are very handsome, of a prevailing rose-colour, quite 4 in. across, with a large conical spur. Lip 3-lobed, lateral lobes forming a tube round the column, midlobe broad and fan-shaped, bifid. The stem which is single or branched, and of a dry woody nature, though only about  $\frac{3}{4}$  in. diam., often attains a great length, ascending to the tops of trees, from among the highest branches of which it loves to thrust its handsome blossoms into the full blaze of the sun. The roots are sparse, long and tough like cords, and take firm hold of the tree on which it grows. Found sparingly all over the Provinces. *Parish*.

Flowers from May to July, and lasts four or five weeks in beauty. *Williams*.

Midlobe of lip 2-fl'd., lobes hatchet-shaped, sac long conical. *Stem* many feet long, branched, and leaves as thick as a goose-quill. *Leaves* 6—8 in. *Peduncle* 6—12 in.; bracts short, ovate; flowers 3—6, 4 in. diam., white or rose-cold.; sepals and petals undulate; lip hairy

towards the base ; side lobes broad, incurved, yellow within, crimson spotted ; midlobe much larger, flabellately reniform purple or rose-colour, sac 1 in. long ; column hairy in front. *Capsule* 1 in., clavate. *Hook. f. Fl. Brit. Ind. vi. 49—50.*

Lower Bengal ; at Seeb Saugur *Clarke*. Assam, Silhet, the Khasia Hills, Chittagong and Upper Burma, *Roxburgh, Wallich, &c.*

Bot. Mag. t. 4114 ; Paxt. Mag. v. t. 193 ; Griff. Notul. iii. 352 ; Warn. Sel. Orchid. Ser. iii. t. 2 ; Reichenbachia, i. t. 27 ; Rev. Hortic. 1856, t. 22 ; Hook. 1st Cent. Orch. Pl. t. 88 ; Veitch Man. Orch. Pl. vii. p. 104 ; the Garden, 1892, xlii. p. 276, t. 876 ; C. P. 9.

SYN.—*Dendrobium teres*, Roxb. Fl. Ind. iii. 485.

**13. V. Vipani**, Rchb. f. in Gard. Chron. 1882, ii. 134, 29.

Leaves very narrowly linear decurved deeply unequally 2-toothed, raceme few-fl'd., sepals and rather smaller petals cuneate-oblong obtuse undulate gradually narrowed to the base, pale olive green or ochreous, barred with short brown purple lines, lip panduriform, side lobes semi-ovate golden yellow, midlobe olive-green 2-callous at the base, spur conical glabrous within. *Hook. f. Fl. Brit. Ind. vi. 54* (among species unknown to him).

Burma, *Vipani*.

**V. (Acampe) Wightiana**, see *Saccolabium Wightianum*.

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## KEY TO SPECIES.

VANDA,\* R. Brown.

Epiphytes ; stems leafy. *Leaves* very coriaceous or fleshy, flat keeled or terete. *Flowers* usually large, highly coloured, in simple lax or dense racemes. *Sepals* and *petals* subequal, spreading or incurved, bases narrowed. *Lip* large, base usually saccate or spurred, side lobes

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\* See Appendix A, Genus 60.

large or small (rarely O), placed on the sides of the sac or spur; mid-lobe various, fleshy, disk usually ridged or lamellate. *Column* short, stout; foot not or very shortly produced; anther 2-celled; rostellum obscure; pollinia 2, didymous, subglobose or obovoid, strap broad short or long geniculate, gland rather large (slender in § *Anotis* and gland small).

#### SECTION I. Euvanda.

\* Leaves terete. Scape few-fl'd. See also *Ærides cylindricum*.

No. 12, *V. teres*.

\* \* Leaves flat or channelled and keeled. Scape usually many-fl'd.

† Flowers  $\frac{1}{2}$ — $1\frac{1}{2}$  in. diam. (See also *V. Bensoni*.)

No. 5, *V. caerulea*; No. 10, *V. parviflora*.

† † Flowers 2 in. diam. and upwards (smaller in *V. Bensoni*).

No. 2, *V. Bensoni*; No. 4, *V. caerulea*; No. 6, *V. Denisoniana*; No. 9, *V. Parishii*; No. 11, *V. Roxburghii*.

#### SECTION II. Anota.

No. 7, *V. densiflora*.

The two species of this section (the above and *V. violacea*) have been referred to *Saccolabium*, *Vanda*, and one of them to *Rhynchostylis*. In whichever genus placed they are aberrant; the ridged lip is quite that of *Vanda* but the lip and the strap of the pollinia is as in *Rhynchostylis*; and the spur is hardly that of *Vanda*, but rather of *Saccolabium*.

#### SECTION III. Cristatæ.

No Burmese species.

### STAUROPSIS,\* Reichb. f.

Epiphytes; stems stout, leafy. Leaves distichous, coriaceous, flat, 2-lobed. Flowers in lateral racemes. Sepals and similar but smaller petals widely spreading. Lip sessile, adnate to the base or sides of the column, incurved, base simple or saccate, lobes narrow, disk naked or hairy. Column short, thick, foot O, top truncate; anther 1-celled; pollinia 2, subglobose, 2-cleft; strap broad, gland large. Hook. f.

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\* See Appendix A, Genus 51.

**1. *Stauroopsis giganteus*, Benth. in Gen. Plant. iii. 572.**

A very large species with broad fleshy strap-shaped leaves, 1 in. or more long by 3—4 in. broad, blunt and emarginate at the end. Raceme drooping, 1 ft. or more long consisting of large yellow flowers 3 in. across, marked irregularly with round spots of a reddish-brown colour. It forms masses of extraordinary size. One plant I found on the Shan border was a great deal more than I could have packed on an elephant. It is apparently a very local plant, but abundant in some places, viz., in the shady jungles about Tavoy, and in the Yunzalin district. *Parish*.

Flowers very large golden-yellow ocellately blotched with cinnamon, sepals and petals spatulately obovate, lip white hatchet-shaped obtuse, base cordate, side lobes rounded, midlobe narrow obtuse fleshy, disk with a broad conical callus.

*Stem* pendulous. *Leaves* 1—2 ft. by 2—3 in., very thick, flat, *Raceme* 10—15 in., decurved, many-fl.; rachis very stout; bracts short, broad; flowers 3 in. diam.; lateral sepals horned behind below the tip. Griffith describes two sterile stamens between the lateral sepals and petals. *Hook. f. Fl. Brit. Ind. vi. 27*.

SYN.—*Fieldia gigantea*, Rchb. f. Xen. Orchid. ii. 39; Walp. Ann. vi. 871.

*Vanda gigantea*, Lindl. in Wall. Cat. 7326; Gen. and Sp. 215; Fol. Orchid. 2, Bot. Mag. t. 5189; Rchb. f. l. c. 38 t. 112. Ill. Hort. 1861, 277; Rev. Hort. 1874, t. 291; Batem. 2nd Cent. t. 142; Xen. Orchid. ii. t. 112; C. P. 1.

*V. Lindleyana*, Griff. Notul. iii. 353.

**ARACHNANTHE, Blume.****1. *Arachnanthe bilinguis*, Benth. in Gen. Plant. iii. 573.**

Scape few-fl., lateral sepals and petals oblanceolate, lip with a large recurved spur under the limb, side lobes very small, rounded.

Tenasserim; Moulmein *Parish*. The Khasia Mts.; at Nurtiung (*Is. Jerdon*).

*Stem* elongate, as thick as a swan's quill or less. *Leaves* 5—8 by  $\frac{1}{2}$ — $\frac{3}{4}$  in., keeled, coriaceous, unequally 2-lobed. *Scape* long or short, greenish-brown; flowers 4—6, distant,  $1\frac{1}{2}$  in. diam.; sepals and petals obtuse, yellowish with broad red-brown or blotched margins; lip yellow, very narrow, recurved; spur adnate, recurved, as long as the limb, the tip of which is hence bi-fid with the lobes superposed; strap of pollinia short, gland large. *Hook. f.* Fl. Brit. Ind. vi. 28.

SYN.—*Renanthera bilinguis*. Rchb. f. Xen. Orchid. i. 7, t. 4; C. P. 20.

*R. labrosa*, Rchb. f. l. c. 88.

*Arrynchium labrosum*, Lindl. in Paxt. Fl. Gard. i. 142.

## KEY TO SPECIES.

### ARACHNANTHE, \* Blume.

Characters of *Stauroopsis* but lip jointed on to the base of the column and mobile.

The character of the mobile lip requires confirmation in the living plant of some species.

\* *Flowers in simple racemes. Side lobes of lip much smaller than the midlobe.*

NO. 1, *A. bilinguis*.

\* \* *Flowers paniced. Side lobes of lip nearly equalling or exceeding the midlobe.*

No Burmese species.

\* See Appendix A, Genus 52.

**GRAMMATOPHYLLUM,\*** Blume.

Large stout epiphytes. *Leaves* linear, distichous, jointed on their sheaths. *Scapes* lateral, long, stout; flowers large racemose. *Sepals* and *petals* subequal, spreading. *Lip* small, adnate to the base of the column (mobile?) erect, concave; its side lobes embracing the column, mid-lobe short, recurved. *Column* semiterete, foot O, top incurved; anther broad, 2-celled; pollinia 2, subglobose, 2-cleft, attached one to each horn of a curved strap or gland. *Hook. f.*

1. **G. speciosum**, Blume Bijdr. 377, fig. 20; Rump. iv. 47, t. 191.

A very large (gigantic Hooker calls it) epiphytal caulescent orchid. The stems (it is straining a term to call them pseudobulbs) are numerous, and take their rise from a huge dense tangled mass of short, branched, fine wiry roots, 3—5 ft. in circumference; the stems are 4—5 ft. long, 2 or 2½ in. diam., rather flattened, clothed for nearly their whole length with long, membranous, strap-shaped distichous leaves, which are close-set and sheathing at their base. Roughly speaking, they may be compared to large-sized sugar-canes. This “Queen of Orchidaceous Plants,” to which for grandeur nothing in East or West can compare, is a native of the Mergui Archipelago, where it grows on betelnut trees. As soon as I discovered them, I brought two or three plants to Moulmein. The climate, however, proved unfavourable to them, and they yearly became smaller, and never gave the slightest indication of flowering. The plant seems to require a continually moist atmosphere throughout the year, which it can obtain in and around the Straits (where it was first discovered) and may in some fair measure have also in the islands of the Mergui Archipelago, which probably, is its northern limit. *Parish.*

After stating that the plant sometimes attains the height of 8 or 10 ft., and the leaves a length of 2, the description (in Bot. Mag.) proceeds as follows :—

Scape, nearly the size of one's finger, from 4—6 ft. long, radical, erect, terete, quite smooth, many-fl'd. Flowers distant, expanding from the base upwards, each with a large broad concave bract, an inch long. Flower-bud 2½ in. long. Expanded flowers nearly 6 in. across.

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\* See Appendix A, Genus 43.

Sepals and petals much spreading and slightly reflexed, broad, oblong or subovate, yellow, richly spotted and blotched with deep red-purple. Lip small for the size of the flower, 3-lobed,  $1\frac{1}{2}$  in. long; the lobes obtuse, the side lobes convolute over the column; the disk furrowed with 3 plates more elevated in the centre, marked with red streaks, and where the streaks are the lines are ciliated; middle lobe entire. Column curved a little downwards, semi-terete, and partially spotted. *Bot. Mag.* 5157.

Tenasserim, *Parish*. Perak, *Scortechini*. Malacca, *Griffith* (*Keu Distrib.* 5318), *Maingay* (*K. D.* 1655). Distrib. Java, Borneo.

Lindl. Gen. and Sp. 628; Miquel Fl. Ind. Bat. iii. 708; *Bot. Mag.* t. 5157; Paxt. Fl. Gard. ii. t. 69; Fl. des Serres, t. 1386; Batem. 2nd. Cent. Orchid. t. 181; Jard. Fleur. t. 235; Gard. Chron. 1878, ii. 181, f. 36; 1890, i. 289, f. 46; Walp. Ann. vi. 628; Fl. Brit. Ind. vi. 18; C. P. 168.

SYN.—*G. fastuosum*, Lindl. in Paxt. Fl. Gard. ii. t. 159, sub. t. 69.

*G. macranthum*, Rchb. f. Xen. Orchid. ii. 16; Walp. Ann. l. c.

*Pattonia macrantha*, Wight Ic. t. 1750.

*Gabertia scripta*, Gaud. in Freyc. Voy. Bot. 425.

*Cymbidium scriptum*, Swartz in Schrad. Diar. 1799, 228; Willd. Sp. Pl. iv. 100.

*Epidendrum scriptum*, Linn. Sp. Pl. 1351.—Rumph. Amboin. vi. 95, t. 42.

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### RENANTHERA,\* Lour.

Epiphytes; stem elongate, branched, leafy; pseudobulbs O. *Leaves* rigid, 2-lobed. *Flowers* large or medium-sized, in lateral spreading panicles. *Sepals* narrow, widely spreading, dorsal erect, lateral deflexed or placed under the lip, oblanceolate or spatulate, at first parallel or

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\* See Appendix A, Genus 59.

connate. *Petals* narrow. *Lip* very small sessile, jointed on the base of the column, saccate, side lobes erect. *Column* short, truncate, foot O ; pollinia large 2-grooved or 2-partite, strap short, gland transverse, Hook. f.

The treatment recommended for *Vanda* as regards heat and moisture will also suit these plants. They will do well on blocks if they obtain a good supply of water during the growing season, after which give only enough water to keep the stems and leaves from shrivelling. They require plenty of light. Propagated in the same way as *Aerides* and *Vanda*. *Williams*.

**R. bilinguis**, Rchb. f. See *Arachnanthe bilinguis*.

1. **R. coccinea**, Loureiro, Fl. Cochin. Ch. ii. 637.

Stem many feet long, climbing up trees to a considerable height, simple or branched, sending out long wiry roots, here and there leafy at the termination of the branches. Leaves 2-ranked, thick and fleshy, varying in length and breadth, 6—8 in. by 1—2. Flowers red, very handsome,  $2\frac{1}{2}$ —3 in. across, in a large lateral panicle. Lip small, striped with yellow, bagged in the middle, 3-lobed ; side lobes rounded, erect ; midlobe ovate, pointed. Discovered many years ago in Cochin-China. Found by me only on the Moscos Islands (opposite Tavoy). *Parish*.

Flowers 2— $2\frac{1}{2}$  in. diam., lateral sepals free, much larger than the dorsal, midlobe of lip ovate-lanceolate recurved.

*Stem* 1—3 ft., stout. *Leaves* 2—4 in., distant, oblong or shortly lorate. *Peduncle* 2—3 ft., erect ; branches long, divaricate, lax-flid. ; very small, broad ; lateral sepals scarlet, dorsal and petals linear, orange red, spotted ; lip yellow, tip of small spur and midlobe scarlet ; strap of pollinia linear acute. *Hook. f.* Fl. Brit. Ind. vi. 48.

Lindl. Gen. and Sp. 217 ; Bot. Reg. t. 1131 ; Bot. Mag. t. 2997—8 ; Paxt. Mag. t. 49 ; Rchb. Fl. Exot. t. 114 ; Walp. Ann. vi. 875 ; Warner Sel. Orchid. Pl. ii. t. 37 ; Puydt. Les Orchid. 226. f. 229 ; Hook. 1st. Cent. Orchid. Pl. t. 90 ; Veitch Man. Orchid. Pl. vii. p. 83 ; C. P. 167.



**CECROCLADES**, Lindl.

**C. flexuosa**, Lindl. Gen. and Sp. 236, see *Cleisostoma ramosum*

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**ÆRIDES**, Loureiro.

Caulescent epiphytes with 2-ranked leaves. Flowers in racemes or spikes. Perianth spreading or more or less closed. Sepals and petals nearly equal, the lateral sepals being often oblique at the base, and connate with the prolonged base of the column. Column short. Lip jointed with the claw of the column, spurred, or bagged, 3-lobed, side lobes small, centre variously shaped. Pollen-masses 2, normal *Parish*.

They are very easy to cultivate in the Tropics, growing freely on trees; they increase quickly and soon form wonderfully fine masses. Being found naturally in the valleys, they do not need very much rest, and it is important that they be supplied with sufficient moisture even during the cold weather, as if allowed to become too dry the leaves will shrivel and fall. *Jennings*.

They may be grown in baskets or rafts of wood, or in pots. They are propagated by cutting them into pieces, with roots attached to each piece. Some kinds, however, are shy in throwing up young shoots, and this makes these sorts very scarce. Those of the *Æ. odoratum* group are the most easy to increase. If the plants get into an unhealthy condition the best way is to cut away the bottom portion and give the remainder fresh moss, with plenty of water at the roots. *Williams*.

**Æ. affine**, see *Æ. multiflorum*.

1. **Æ. crassifolium**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 145; C. P. 146.

Very stout and compact in growth with thick coriaceous oblong obliquely-bilobed dark green leaves, and long drooping spikes of ame-

thyst purple deliciously fragrant flowers, which are produced in May or June, and continue perfect for a very long time. The flowers are amongst the largest in the family, and the bluntly ovate projected mid-lobe of the lip is of a deeper, richer purple than the rest of the flowers. It is a gorgeous species and has been called "King of all the *Ærides*." *Williams*.

Characters of *Æ. falcatum*, but much more robust, with shorter leaves, dark purple flowers and the spur geniculate at the base and not hidden under the midlobe of the lip.

Very nearly allied to *Æ. falcatum*, the chief difference being the form of the spur and that the sides of the midlobe of the lip are so reflected as that their under surfaces meet. *Hook. f. Fl. Brit. Ind. vi. 46*.

Tenasserim ; at Moulmein, *Parish*.

Rchb. f. in Gard. Chron. 1877, i. 633 ; and ii. 492, f. 96 ; Otia Hamb. 43 ; Warn. Sel. Orchid. Ser. 3, t. 12 ; Paxt. Fl. Gard. reissue, t. 1 ; Orchidoph. 1885, p. 370 ; Veitch Man. Orchid. vii. Contra. p. 66.

SYN.—*Æ. expansum*, Rchb. f. l. c. 1882, ii. 40. Flowers in elongated racemes, sepals and petals creamy white marked with purple, the well expanding lip having amethyst blotches on the lateral lobes and on the sides of the midlobe, the broad anterior portion of which is deep purple and the spur greenish ; it flowers in June and July. *Williams*.

Gartenfl. 1889, t. 1296.

*Æ. falcatum expansum*, *Williams*.

Var. *Leonice*, Rchb. f. in Bull. Soc. Tor. d'Orticult. x. t. 14.

Is described as having retuse side lobes of lip and an expanded midlobe. *Hook. f. l. c.*

*Williams*, Orchid. Man. t. 14 ; Orchid. Alb. t. 328 ; Orchidoph. 1885, 301,

SYN.—*Æ. expansum leonæ*.

*Æ. difforme*, Wall. Lindl. Gen. & Sp. 242, see *Ornithochilus fuscus*.

2. *Æ. crispum*, Lindl. in Wall. Cat. 7319; Gen. & Sp. 239; in Bot. Reg. 1841, t. 55; in Gard. Chron. 1842, 711 (with fig.); in Journ. Linn. Soc. iii. 41.

The flowers grow in long drooping racemes larger than those of any other species, white tipped with rosy pink, deliciously scented, the lip 3-lobed and upwards of 1 in. long, the midlobe fringed and almost wholly of a bright rose, or sometimes deep rose purple. The blossoms, which are abundant, are produced in June and July, and last 2—3 weeks in good condition. *Williams*.

Midlobe of lip large broadly ovate-oblong, obscurely 3-lobed crenate or toothed, spur very short obtuse.

*Stem* 4—10 in., very stout. *Leaves* 4—8 in., from oblong to lorate, variable in breadth, thickly coriaceous, lobes unequal rounded. *Racemes* 8—12 in., inclined or drooping, simple or branched; pedicels very robust; flowers 1½ in. diam., sweet-scented; sepals and petals very broad, pale rose; lip geniculately inflexed at the claw, rose or purple, 2-cornute at the base; spur much shorter than the blade, and projecting forwards under it; anther long-beaked, strap of pollinia slender below, dilated above. *Capsule* 1½—2 in., clavate or pyriform, angles subalate. I find no character whereby to separate *Æ. Lindleyanum*. Lindley says of *Æ. Brookeii*, more odorous than *Æ. odoratum*. *Hook. f.* Fl. Brit. Ind. vi. 45.

Western Ghâts; from the Concan to Travancore, *Hook. f.* Burma, *Parish*.

Bot. Mag. t. 4427; Dalz. & Gibs. Bomb. Fl. 265; Fl. des Serres, v. t. 48; Walp. Ann. vi. 896; Ill. Hort. 1847, 123; Gard. Chron. 1859, 24, with fig.; Belg. Hort. 1876, 287; Warn. Orchid. Alb. vii. t. 293 (var.); Veitch Man. Orchid. Pl. vii. contra p. 67; C. P. 183.

SYN.—*Æ. Lindleyanum*, Wight Ic. t. 1677 bis; Lindl. in Journ. Linn. Soc. iii. 41; Wall. l. c. 879.

*Æ. Brookeii*, Lindl. in Gard. Chron. 1841, 518; 1842, 559; Batem. in Bot. Reg. 1841, Misc. 55; Paxt. Mag. Bot. ix. t. 145; Fl. des Serres t. 151.

*Æ. Warneri*. Hort.

3. *Æ. decumbens*, Griff. Notul. iii. 365 without description Ic. Pl. Asiat. t. 320, fig. 1 ; Lindl. in Journ. Linn. Soc. iii. 423.

*Stem* very short. *Leaves* 2—4 in., elliptic, acute, many-nerved ; peduncles several, short, stout, few-fl'd. ; bracts small, triangular ; pedicels with ovary  $\frac{3}{4}$  in., erect ; flowers  $\frac{3}{4}$  in. diam. ; lateral sepals very broad, obtuse. This has the habit of a *Phalænopsis*. *Hook. f.* Fl. Brit. Ind. vi. 48 (among species unknown to him).

4 *Æ. Emericii*, Rchb. f. in Gard. Chron. 1882, 586.

The flowers are in drooping racemes, the sepals and petals white with a broad purple-lilac stripe down the centre of each, and the lip white with the middle lobe purple-lilac, and marked with numerous small spots of the same colour on the interior portion of the spur ; it flowers in September and October. *Williams*.

Lobes of leaf long, narrow, subacute, sepals longer than the petals, midlobe of lip lanceolate acute.

*Stem* 6—8 in. *Leaves* 10—12 by  $\frac{3}{4}$ —1  $\frac{1}{2}$  in., lobes much longer than in *Æ. odoratum*. *Racemes* 6—8 in. ; flowers  $\frac{1}{2}$  in. diam., pale lilacs pedicels 1 in., side lobes of lip rounded, entire ; spur short, stout ; foot of column very short ; anther shortly beaked ; strap of pollinia long, linear. Much the smallest-flowered of the Indian species. *Hook. f.* Fl. Brit. Ind. vi. 47—48.

Andaman Islands, *Berkeley*.

5. *Æ. falcatum*, Lindl. in Paxt. Fl. Gard. ii. 142.

A fine free-growing plant with a good deal of the habit of *Æ. crispum*. The flowers grow in dense pendulous racemes of a creamy white with a crimson spot at the apex of the sepals and petals, and the lip, which is 3-parted, with the lateral lobes obtusely falcate, and the middle obovate lobe convex and ciliated, is deep rose in the middle, the edges white barred with rose. It is a distinct and striking species, and was first flowered in 1847 by Mr. Eyles, when gardener to Sir G. Larpent of Roehampton, after whom it is sometimes called. *Williams*.

Side lobes of lip half as long as the clawed midlobe dimidiate oblong or falcate, midlobe ovate or ovate-cordate, sides replicate erose, spur parallel to the midlobe and concealed under it.

*Stem* 6—8 in., robust. *Leaves* 8—12 by 1—1 $\frac{3}{4}$  in. *Raceme* decurved or pendulous, lax-flid. ; flowers 1—1 $\frac{1}{3}$  in. diam., white, pale violet, purple or pink ; sepals and petals often tipped with a darker shade, and lip usually darker ; lateral sepals with a very broad base ; column beaked, foot elongate, anther long-beaked, strap of pollinia slender, gland small. *Hook. f. Fl. Brit. Ind. vi. 46.*

Tenasserim, *Wallich, Parish, &c.*

Rchb. f. Xen. Orchid. i. 220, t. 92 ; Morren Belg. Hort. 1876, 288 ; Walp. Ann. vi. 897 ;

SYN.—*Æ. Larpentæ*, Hort. Makoy. Prix. Cour. 1862 ; Rchb. f. in Otto and Dietr. Gartenz. 1856, 219.

*Æ. retrofractum*, Wall. MSS.

*Æ. Larpentæ*, see *Æ. falcatum*.

*Æ. Lobbii*, see *Æ. multiflorum*.

# 6. *Æ. mitratum*, Rchb. f. in Bot. Zeit. 1864, 415.

A very distinct and charming species of small stature. The stems are short with abundant thick aërial roots, the leaves being 2 ft. long, cylindric attenuately-acuminate or whip-like, dark green, and the flowers in numerous dense erect racemes, 5—10 in. long, the sepals and petals pure waxy white, and the broadly trulliform obtuse lip rosy purple. A rare and elegant species. *Bot. Mag. t. 5728.*

Leaves very long, filiform, side lobes of lip minute uncinatè, midlobe broadly ovate retuse, spur short inflated.

*Stem* 1—2 in., and roots very stout. *Leaves* 2—3 ft.,  $\frac{3}{8}$  in. diam., deeply grooved above. *Racemes* many, suberect, 3 in. long, cylindric ; peduncle very stout ; bracts minute, acute ; flowers  $\frac{2}{3}$  in. diam. ; petals and sepals subsimilar, oblong, tips rounded, white or tipped with violet ; lip longer and broader than the sepals, violet ; spur contracted at

the neck, inflated, compressed, base truncate, obtuse, tip pointing forwards. *Hook. f.* Fl. Brit. Ind. vi. 44.

Tenasserim ; at Moulmein (*Hort. Day.*).

7. *Æ. multiflorum*, Roxb. Cor. Pl. iii. 63, t. 271 ; Fl. Ind. iii. 475.

Midlobe of lip hastately ovate, tip rounded, spur short straight.

*Stem* 4—10 in., stout. *Leaves* 6—8 in., deeply channelled and keeled, variable in breadth, 2-lobed. *Racemes* 6—12 in., rarely branched, shortly peduncled ; flowers  $\frac{3}{4}$ — $1\frac{1}{4}$  in. diam., rose-purple, sometimes spotted with darker ; sepals and petals subequal, oblong, tips rounded ; lip twice as long, sides recurved, claw geniculately inflexed, spur  $\frac{1}{4}$  as long as the midlobe, pointing forwards under it with an incurved fleshy 2-lobed callus on the base of the midlobe ; column beaked ; anther long-beaked, strap long slender. *Capsule*  $\frac{2}{3}$ —2 in., subclavate, stoutly pedicelled. Common and variable. Lindley overlooked Roxburgh's works. In Griffith's Eastern Himalayan collections, a fruiting specimen of which is a different species, or perhaps a very large var. of this or *Æ. Fieldingii*, with leaves 12—14 by  $1\frac{1}{2}$  in., and a stout raceme 12—16 in., the capsules are of *multiflorum*. *Hook. f.* Fl. Brit. Ind. vi. 44—45.

Tropical Himalaya ; from Garwhal eastwards ; the Khasia Hills, southwards to Tenasserim. *Hook. f.*

Belg. Hortic. 1876, 286 ; Wap. Ann. vi. 897.

SYN.—*Æ. affine*, Wall. Cat. 7316 ; Lindl. Gen. & Sp. 239 ; Sert. Orch. t. 15 ; in Journ. Linn. Soc. iii. 41 ; Bot. Mag. t. 4049 ; Warn. Sel. Orch. Ser. i. t. 21 ; C.P. 63.

*Æ. roseum*, Lodd. ex Paxt. Fl. Gard. ii. 109, t. 60 ; Jard. Fleur. ii. t. 200 ; Gartenfl. viii. 253, t. 267 ; Ill. Hortic. iii. t. 88.

*Æ. Lobbii*, Hort. ex Gaud. in Ill. Hort. 1868, t. 559 (an Teism. & Binn. ?) ; Orchid Alb. i. t. 11 ; C. P. 25 ; Veitch Man. Orch. Pl. vii. opposite p. 75.

Flowers numerous, white slightly tinted with soft rose, and faintly dotted towards the tips ; the lip washed with violet, the colour strongest

on each side the white central line of the broad ovate anterior part. A very showy kind. There are many varieties, some of them producing long branching spikes. Flowers in June and July. *Williams*.

*Æ. Veitchii*, Hort. ex Morven in Belg. Hort. 1876, 291; *Williams* Man, 70.

*Æ. trigonum*, Klotzch. in Otto & Dietr. Allgem. Gartenz. 1855, 177.

*Epidendrum geniculatum*, Herb. Ham.

Var. *Æ. Lobbii Ainsworthii*. A very fine form producing spikes about 2ft. long, which are well branched: the colour is very bright and more effective than in the type. Moulmein. *Williams*.

### 8. *Æ. odoratum*, Lour. Fl. Coch. 525.

A free growing plant flowering very abundantly. The leathery leaves are ligulate, keeled, pale green, and obliquely-obtuse at the apex. The flowers grow in pendulous many-fl. racemes longer than the leaves and are creamy white, blotched and shaded with pale magenta, and have a delightful perfume; the lip is remarkable for its large upturned spur. Specimens have been seen 5ft. high and 4ft. in diam. with 50—60 spikes. *Williams*.

Common in Bengal, Sikkim and Burma. Flowers white tipped with pale pink; an abundant bloomer, very fragrant and lasting a long time. It is one of the oldest-known of Indian orchids. *Jennings*.

Lobes of leaf large rounded, lateral sepals much larger than the dorsal and petals, midlobe of lip oblong-lanceolate, acute, entire or erose.

*Stem* 4—12 in. very stout. *Leaves* 6—10 by  $\frac{3}{4}$ — $1\frac{3}{4}$  in. *Racemes* many 10—12 in.; peduncle and rachis stout; flowers purple to nearly white, sweet-smelling, often purple spotted or tipped; side lobes of lip subcuneate, midlobe short; spur very large, uncinately incurved; column short; anther obtuse; strap of pollinia not long, linear, gland small. *Capsule* 1— $1\frac{1}{2}$  in., oblong-clavate, angles obtuse; pedicel  $\frac{1}{3}$  in., very stout. *Hook. f.* Fl. Brit. Ind. vi. 47.

Tropical Himalaya; Nepal, *Wallich*; Sikkim, *J. D. H.* The

Khasia Hills, Silhet, Chittagong and Tenasserim. The Concan, *Heyne in Herb. Rottl.* Distrib. Java, China, Cochin-China.

Lindl. Gen. and Sp. 239; in Journ. Linn. Soc. iii. 41; Bot. Mag. 4139; Paxt. Fl. Gard. ii. t. 143; Flor. Cal. ii. 75; Maund. Botanist iv. t. 180; Knowles and West. t. 75; Hartm. Parad. ii. t. 4; Walp. Ann. vi. 898; Lindenla, t. 14 (var.); Hook. 1st. Cent. t. 89.

SYN.—*Æ. cornutum*, Roxb. Hort. Beng. 63; Fl. Ind. iii. 472, Bot. Reg. t. 1485.

Var. *Virens*, one of our most lovely orchids: it is very near to *Æ. odoratum* but far finer. Leaves broad, blunt and depressed, flowers in long elegant drooping racemes, individually about 1 in. long, waxy white spotted with violet, deliciously fragrant. Sepals and petals obovate obtuse. The lip terminates in a pointed incurved and upturned spur, its 3 lobes are connivent, the side lobes erect and toothed and the middle incurved between them and serrated. All these close over the column and anther, completely hiding them, and when the lip is forcibly opened, it flies back to its closed position much as the flower of the snapdragon does. *Parish.*

Lour, Bot Reg. 1843, Misc. 48; *vide* Bot. Mag. 4139; C. P. 2.

### 9. *Æ. Pachyphyllum*, Rchb. f. in Gard. Chron. 1880, ii. 230.

Leaves short most fleshy obtusely unequally 2-lobed, raceme short few-fl'd, sepals and rather shorter petals oblong-ligulate obtusely acute crimson-lake, side lobes of lip subtriangular short, midlobe purple triangular minute, spur white cylindric obtuse inflated longer than the pedicelled ovary, column white. *Hook. f.* Fl. Brit. Ind. vi. 48 (among species unknown to him).

Burma (*Hort. Veitch.*).

*Æ. roseum*, see *Æ. multiflorum*.

### 10. *Æ. suavissimum*, Lindl. in Journ. Hort. Soc. iv. 263; in Paxt. Fl. Gard. ii. 141, t. 66.

Differs from *Æ. odoratum* in the midlobe of the lip being longer and emarginate. Said to be the sweetest scented species of the genus,



but more definite characters are wanting to distinguish it from *Æ. odoratum*. The sepals and petals are rosy with often darker tips, the spur yellow mottled red. *Hook. f.* Fl. Brit. Ind. vi. 47.

Burma, *Hook. f.*

Jard. Fleur. t. 213; Rolf. in Gard. Chron. 1890, i. 43; Walp. Ann. vi. 808.

SYN.—*Æ. Reichenbachii*, Linden in Koch and Fintelm. Wochenschrift, 1858, 61; Rchb. f. Xen. Orchid. ii. 11, t. 104.

*Æ. nobile*, Warner Sel. Orchid. Ser. 1 t. 11; Gartenfl. 40, f. 641.

*Æ. Rohanianum*, Rchb. f. in Gard. Chron. 1884, i. 206.

*Æ. flavidum*, Lindl. in Paxt. Fl. Gard. ii. 101.

*Æ. Ballantinianum*, Rchb. f. in Gard. Chron. 1885, ii, 798. is an early flowering form. *Hook. f.*

**Æ. Virens**, see *Æ. odoratum*, var. *virens*.

## KEY TO SPECIES.

*ÆRIDES*,\* Lour.

### Section I.

No Burmese species.

### Section II.

\* *Lip horizontal or inflexed.*

No. 1, *Æ. crassifolium*; No. 2, *Æ. crispum*; No. 5, *Æ. falatum*; No. 6, *Æ. mitratum*; No. 7, *Æ. multiflorum*.

\* \* *Lip deflexed.*

No Burmese species.

### Section III.

No. 4, *Æ. Emericii*; No. 8, *Æ. odoratum*; No. 10, *Æ. suavisimum*.

\* See Appendix A, Genus 58.

**ORNITHOCHILUS,\*** Wallich.

Epiphytes : *Stem* very short, pseudobulbs O. *Leaves* few, broad, flat. *Scapes* lateral, slender, flowers small, racemed or paniced. *Sepals* spreading, subequal, lateral obliquely obovate. *Petals* linear. *Lip* much larger than the sepals, clawed, side lobes subquadrate, midlobe clawed inflexed lobulate and fimbriate, with a velvety flap over the mouth of the short incurved spur, which is distant from the base. *Column* short, foot O ; rostellum forcipate ; anther low 2-celled, pollinia 2, subglobose or oblong grooved; strap obtusate. *Hook. f.*

**1. O. fuscus**, Wall. in Lindl. Gen. and Sp. 242.

Tenasserim ; at Moulmein, *Parish*.

*Stem*  $\frac{1}{4}$ — $\frac{1}{2}$  in., 2—3 leaved. *Leaves* 3—7 by 1—1  $\frac{1}{2}$  in., obliquely elliptic-oblong, acute, many-nerved, base narrowed. *Racemes* simple or sparingly branched, 6—12 in., lax-flid. ; bracts small, subulate ; flowers  $\frac{1}{3}$ — $\frac{1}{2}$  in. broad ; sepals and petals yellow streaked with red ; side lobes of lip striped with brown ; midlobe variable in breadth, red, its lobules reflexed, the mid-one entire or fimbriate. *Capsule* 1 in. fusiform, pedicelled. *Hook. f.* Fl. Brit. Ind. vi. 76.

SYN.—*O. cubefarum*, Hance in Journ. Bot. xxii. (1884), 364.

*Ærides difforme*, Wall. in Lindl. l. c. 242 ; Sert. Orchid. frontisp. f. 7 ; Rchb. f. in Gard. Chron. 1865, 698 ; Lindl. in Journ. Linn. Soc. iii. 41 ; Walp. Ann. vi. 899 ; C. P. 184.

*Æ. Hystrix*, Lindl. in Journ. Linn. Soc. 42 (not of Gen. and Sp.).

**SACCOLABIUM,†** Blume.

This genus contains some of the finest orchids in cultivation. They are evergreen plants, very compact in their growth, the stems furnished with long thick leathery, or fleshy distichous pendent leaves, from the

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\* See Appendix A, Genus 67.

† See Appendix A, Genus 61.

axils of which the flowers are produced in long graceful simple or branched recurved racemes, which often measure from 1 to 2 feet in length. The flowers, though not large, are exceedingly effective from their numbers. They have sepals and petals much spread out, and the sessile lip spurred or saccate at the base. They are similar to *Ærides* in habit of growth and require the same general treatment. They thrive in baskets or pots or on blocks, and are propagated in the same manner as *Ærides*. *Williams*.

1. *S. acutifolium*, Lindl. Gen. and Sp. 223; Sert. Orchid. Frontisp. No. 2; in Journ. Linn. Soc. iii. 33.

Stem elongate, leaves acute or acuminate, blade of lip erose, disk naked or very sparingly tubercled.

Usually a larger plant than the small states of *S. calceolare*, with longer stems (4—8 in.) and larger leaves, 4—6 by  $\frac{3}{4}$ — $1\frac{1}{2}$  in. broad, never 2-fld., but very variable. *Perianth* whole-cold. and yellowish red, or more yellow or greenish and mottled with brown; lip white, centre yellow often speckled with red. *Capsule* in Sikkin sp. 3 in. long. *Hook. f.* Fl. Brit. Ind. vi. 61.

Sikkim Himalaya, alt. 3—5000 ft. Khasya Mts., *Gibson*. Burma, see *Parish* below.

Rchb. f. Otia Hamb. 42; Walp. Ann. vi. 883.

SYN.—*S. denticulatum*, Paxt. Mag. Bot. vii. t. 145; Rchb. f. l. c.; ? Bot. Mag. 4772; C. P. 95 B.

Answers to the same general description as *S. Calceolare*, but is totally different in colour, somewhat also in form. I observe that the pollen-masses in this plant are hairy, a circumstance I have never noticed in any other orchid. I have forgotten its habitat. *Parish*.

Paxton's *S. denticulatum* has greenish yellow flowers speckled with brown, and lip is described as erose. Lindley refers it to *S. acutifolium*. The lip of Bot. Mag. plant, apparently derived from the same source, is not erose, but with a broad thick white fringe of long papillæ. *Hook. f. l. c.*

*Ærides umbellatum*, Wall. MSS.

2. *S. ampullaceum*, Lindl. in Wall. Cat. 7307; Sert. Orchid. t. 17; in Journ. Linn. Soc. iii. 35 (excl. syn.).

Leaves suberect acutely 2-fid, or truncate and toothed, raceme subsessile, shorter than the leaves, spur straight.

Tropical Himalaya, alt. 1—3000 ft., from Nepal eastwards. Silhet, Munnipore, Burma, and Tenasserim. *Hook. f.*

*Stem* short, stout. *Leaves* 2—6 in. deeply channelled. *Racemes* shorter than the leaves, cylindric; bracts minute; flowers  $\frac{3}{4}$  in. diam., rose red; sepals and petals broadly obovate, widely spreading; spur longer than the blade of the lip. *Capsule* 1 in., subclavate, angles acute, pedicel  $\frac{1}{2}$  in. Lindley in Journ. Linn. Soc., by oversight probably, refers his *S. rubrum* to this instead of to *curvifolium*. *Hook. f.* Fl. Brit. Ind. vii. 64.—65.

In our Tenasserim plant the leaves are short straight and rigid, commonly stained with purple, not long and curved as they are in *S. curvifolium*, but they probably vary according to locality. Local, but sometimes abundant where found, appearing to effect open arid jungle, and small trees. *Parish.*

Paxt. Mag. Bot. xiii. t. 49; Bot. Mag. t. 5595; Warner. Orchid. Alb. t. 191; Batem. 2nd. Cent. Orchid Pl. t. 186; Wight Ic. Pl. Ind. t. 1673; Journ. of Hort. 1892, xxv. 17, f. 117; C. P. 50.

SYN.—*Ærides ampullaceum*, Roxb. Fl. Ind. iii. 476.

Var. *Moulmeinense* A superb variety of the type, than which it is somewhat more robust in growth; the leaves are spotted on both sides with dull brown, the flower-spike is longer and denser, and the flowers are larger, of an uniform rich deep rose. Moulmein. *Williams.*

Fl. Mag. t. 393 (*roseum*).

3. *S. bellinum*, Rchb. f. in Gard. Chron. 1844, i. 174; 1870 (?) i. 145.

A very pretty dwarf species, with short erect stems clothed with evergreen distichous lorate obliquely bifid leaves, and decurved peduncles bearing a compact corymb of elegant flowers of considerable size. The oblong sepals and petals are straw colour blotched with large patches of

dark brown, and the saccate lip is fleshy, with mauve-purple spots having on each side a large cushion of filiform processes, yellow in the centre, and there marked with spots of bright red. It flowers in Feb. and March, lasting some time in beauty. *Williams.*

Stem rather long, leaves deeply unequally cleft, bracts and flowers large, blade of lip erose, disk echinate and with cushions of cillia at the base.

This resembles a large state of *S. calceolare*, the flowers are 1—1¾ in. diam., bright yellow with large purple blotches. *Hook. f. Fl. Brit. Ind. vi. 61.*

Burma, *Boxall.*

Warner Orchid. Alb. iv. t. 156; Bot. Mag. t. 7142. The Garden. 1889, xxxv, P. 434, t. 7000; Lindenian vii. t. 330. Veitch Man. Orchid. vii. 112.

4. *S. biggibum*, Rchb. f. in Bot. Mag. t. 5766; Otia Hamb. 43.

This very pretty species is at present quite rare. It is a small close growing plant, with very short stems, having persistent linear-oblong bifid bright green leaves, about 4 in. long, and short stalked drooping subcorymbose racemes, bearing about 8 of its curious flowers, of which the spatulate sepals and petals are pale yellow, and the remarkable lip is triangular, white, with a very broad blunt spur, the centre yellow and the edge prettily frilled. *Williams.*

Stem very short, leaves oblong or obovate-oblong 2-fid, bracts small, blade of lip fimbriate, disk smooth with a large 2-lobed callus.

Probably a small state of *S. obliquum*, but the leaves are shorter and broader, 3—4 by 1—1¼ in., and the large bracts seem to be wanting. *Flowers* whole-cold., pale straw-cold. in a drawing by Mr. Gilbert, bright yellow in Bot. Mag. *Hook. f. Fl. Brit. Ind. vi. 61.*

Rangoon, *Benson, Gilbert.* Arracan, *Williams.*

C. P. 1279.

*S. bipunctatum*, Par. & Rchb. f. in Trans. Linn. Soc. xxx. p. 145, see *Cleisostoma bipunctatum*.

*S. blumei*, see *Rhynchostylis retusa*.

**5. *S. buccosum*, Rchb. f. in Gard. Chron. 1871, 938.**

Stem scandent, leaves linear-oblong obtusely 2-lobed, raceme simple or branched much longer than the leaves, sepals broadly ovate much longer than the bottle-shaped spur, lip large, side lobes spreading rounded, midlobe narrowly oblong.

Bhotan Himalaya, *Lister*. Assam ; at Goalpara, *Hamilton*. Sylhet. *Wallich*. Tenasserim, *Parish*.

*Stem* stout, rigid, internodes  $\frac{1}{2}$  in. *Leaves* 3—5 by  $\frac{1}{2}$ — $\frac{3}{4}$  in., fleshy, 5-nerved. *Raceme* with long slender peduncle 5—6 in., laxly many-fld. ; bracts subulate ; flowers  $\frac{1}{3}$  in. diam., yellowish ; sepals 5-nerved ; petals much smaller, cuneately obovate, 3-nerved ; lip yellow, mouth of spur a very narrow chink, neck contracted, base globose didymous ; side lobes of elongate column broad, rounded, top recurved ; anther long-pointed ; straps of globose pollinia very slender arched, gland very minute. Column and lip so different from the genus that Reichenbach l. c. suggests its separation. Lindley's name of *parvulum* is too misleading to be adopted. *Hook. f. Fl. Brit. Ind.* vi. 58—59.

C. P. 268.

SYN.—*S. parvulum*, Lindl. in Journ. Linn. Soc. iii. 36 (in note).

*Oecoclades paniculata*, Lindl. in Wall. Cat. 7334 ; Gen. and Sp. 236. *Cymbidium satyrium*, Herb. Ham.

**6. *S. calceolare*, Lindl. in Wall. Cat. 7302 ; Gen. and Sp. 223 ; Sert. Orchid. Frontisp. 6 ; in Bot. Reg. 1838, Misc. 75 ; in Journ. Linn. Soc. iii. 33 (excl. syn.).**

A small plant with very short stem, the whole not more than about 6 in. in length, bearing a few leaves which are sheathed at the base, linear-oblong, bi-fid. at the end, the two points being unequal and very acute. The flowers, which are few in number, are bound in a sort of umbellate raceme and form a roundish head on a short thick foot-stalk. The sepals and petals are oblong and blunt, being broader at the end than at the base, spreading, but slightly curved forwards, yellow. The lip is a large inflated pouch with a semicircular lamina or plate in front, beautifully fringed. The colour of the pouch is white at top and

orange-yellow at bottom, the lamina and fringe white, but there are some bright red spots on it as also on the edge of the pouch and base of the very short column. From the top of the column, and just below the anther, a large 2-lobed rostellum projects, in which the gland of the pollinia lies. Mergui. *Parish*.

A very common plant, and if two species are not included, very variable. *Hook. f.* Fl. Brit. Ind. vi. 60.

Griff. Notul. iii. 356 ; Itin. Notes, 170, No. 869 ; Ic. Pl. Asiat. t. 334 ; Walp. Ann. vi. 883 ; Paxt. Mag. vi. 97 ; C. P. 95.

SYN.—*Brides calceolare*, Smith in Rees Cyclop. Suppl.

*Gastrochilus calceolaria*, Don Prodr. 32.

*Sarcochilus nepalensis*, Spr. Syst. Veg. iii. 721.

*Epidendrum calceolare*, Ham. MSS.

### 7. *S. curvifolium*, Lindl. Gen. and Sp. 222.

A compact habited dwarf growing species, with short erect stems from 6 in. to 1 ft. high, with distichous linear acutely præmorse deflexed light green channelled leaves, and having erect axillary racemes of small crowded cinnabar-red flowers. It is a free flowering kind and blooms in May and June. It thrives well suspended on a block. *Williams*.

Leaves strongly recurved very narrow, racemes much shorter than the leaves, spur straight.

Very closely allied to *S. ampullaceum*, but the leaves are twice as long, much narrowed and strongly recurved, the flowers more scarlet with a golden lip. The strap of the pollen is figured in Bot. Mag. as broadly triangular ; it should be very slender. *Hook. f.* Fl. Brit. Ind. vi. 65.

Assam ; *Ic. in Hort. Calcutt.* Burma, *Wallich Griffith, &c.* Very abundant in the Tenasserim Provinces, *Parish*.

Ill. Hortic. xii. t. 493 ; Warner Orchid. Alb. t. 107 ; Puydt. Orchid. t. 38 ; Batem. 2nd. Cent. Orchid. Pl. t. 130 ; C. P. 4.

SYN.—*S. rubrum*, Lindl. in Wall. Cat. 7310 ; Gen. and Sp. 222.

*S. miniatum*, Hook. Bot. Mag. t. 5326 (not of Lindl.).

Var. *luteum*. A somewhat rare plant, in habit resembling the above the flowers, however, instead of being orange-scarlet, are clear yellow, which renders it very distinct from the ordinary form. Moulmein. *Williams*.

**S. denticulatum**, Part., see *S. acutifolium*.

8. **S. flavum**, Hook. f. Ic. Pl. ined.

Stem short very stout, leaves close set loriform, deeply unequally acutely 2-cleft, raceme lax-flid., sepals oblong obtuse, lip small, infundibular spur much longer than the sepals with small toothed side lobes and truncate mouth.

Tenasserim ; at Moulmein. *Parish*.

*Stem* 6 in., stout. *Leaves* 4—5 by  $\frac{3}{4}$  in., dark green with darker nerves, apiculate between the lobes ; sheaths  $\frac{1}{4}$  in., deeply grooved. *Raceme* from the base of the stem, with the slender scape 4 in. ; bracts small, recurved ; flowers  $\frac{1}{4}$  in. diam., pale yellow ; column short, broad ; rostellum large, 2-lobed, apparently fleshy. Described from a beautiful drawing by Parish, who observes that there is no apparent septum in the spur. It closely resembles *Sarcanthus Parishii*, but the flowers are yellow. There is no midlobe of the lip and no septum in the spur. *Hook. f.* Fl. Brit. Ind. vi. 58.

9. **S. fragrans**, Par. and Rchb. f. in Journ. Bot. xii. (1874) 197 ; in Otia Bot. Hamb. Fasc. i. 1878, 41.

Dwarf, stem very short, leaves crowded oblong obtuse, very thick raceme shortly peduncled decurved many- and dense-flid., flowers rose-red, lateral sepals orbicular-oblong, petals linear-oblong obtuse, lip large saccate, base suddenly contracted into a decurved spur longer than the sepals and with an inflated tip, limb rhomboidly spatulate fleshy acute toothed towards the tip.

Tenasserim ; at Moulmein, *Parish*.

*Stem*  $\frac{1}{2}$  in. *Leaves* 5—8 by 1 in., bases closely imbricate, deeply channelled. *Raceme* as long as the leaves ; flowers about  $\frac{1}{10}$  in. long, odour of violets ; lip twice as long as the sepals, with a callus at the



insertion of the tumid straight blade ; column very short, sides acute ; anther with a recurved tip ; pollinia globose, sessile on the broad end of the short strap, gland lanceolate much longer than the strap. Described chiefly from a drawing by Parish. *Hook. f. Fl. Brit. Ind. vi. 58.*

Rchb. f. in *Otia Hamb.* 41 ; C. P. 349.

**S. Giganteum**, see *Vanda densiflora*.

**S. Griffithii**, see *Microsaccus Javensis*.

**10. S. Helfer**, Hook f. Ic. Pl. ined.

Stem short, leaves loriform tip contracted notched, panicles shorter than the leaves, sepals orbicular-ovate 1-nerved shorter than the saccate broad spur, petals oblong, blade of lip reniform, half embracing the spur quite entire, lateral lobes narrow erect.

Tenasserim or Andaman Islands. *Helfer (Kew Distrib. 5256)*. Moulmein, *Parish*. Mergui, *Griffith*.

*Stem* 1—3 in. *Leaves* few, close set,  $2\frac{1}{2}$ — $3\frac{1}{2}$  by  $\frac{1}{4}$ — $\frac{1}{3}$  in., sheaths short, black. *Panicle* about equalling the leaves, slender ; bracts minute, acute ; flowers  $\frac{1}{8}$  in. ; dorsal sepal much smaller than the lateral ; blade of lip shorter than the spur ; column very short ; anther short, broad ; pollinia globose, sessile on a large cuneate strap or gland. *Hook. f. Fl. Brit. Ind. vi. 57.*

**11. S. Intermedium**, Griff. MSS. ex Lindl. in Journ. Linn. Soc. iii. 33.

Stem rather long, leaves very narrow acuminate or 2-toothed, blade of lip fimbriate, disk smooth. Perhaps a small form of *S. acutifolium*, but the stem is more slender, the leaves narrower, and the flowers and capsules ( $\frac{3}{4}$  in.) much smaller. *Hook. f. Fl. Brit. Ind. vi. 61.*

Not given as Burmese by Hooker, but named in Parish's list. *B. G.*

Another variety of the *S. calceolare* group, which seems to be only "constans in levitate." It seems to be almost impossible to find two plants alike in this group, and that, if only two could be fixed upon as the extremes at either end, the name *intermedium* might be applied to the rest. *Parish*.

Rchb. f. Otia Hamb. 42.

SYN.—*S. calceolare*, Paxt. Mag. Bot. vi. 97.

—*Saccolab*, Griff. Notul. iii. 357; Ic. Pl. Asiat. t. 333.

## 12. *S. lanatum*, Hook. f.

Stem short, leaves linear-oblong broadly 2-lobed, peduncle very stout longer than the leaves, spikes dense-fl'd. tomentose or woolly, sepals ovate, tips keeled, side lobes of lip triangular, midlobe ovate bicuspidate, spur short saccate traversed by a pubescent ridge from the base of the column to that of the midlobe.

Tenasserim; at Moulmein, *Parish*, *Scott*.

*Stem* very stout. *Leaves* 3—4 by 1—1 ¼ in., thickly coriaceous, keeled. *Scapæ* with long appressed sheaths, simple or branched; spikes 4—7 in.; bracts ½ in. large, ovate, acuminate, spreading or reflexed; flowers ½ in. long; sepals dingy purple and green; petals obovate, ciliate, yellow and purple; side lobes of lip notched on the inner margin, ciliate; midlobe with a large pubescent gibbous compressed callus descending into the spur, mouth of spur contracted to a slit with a pubescent raised border; column stout, recurved, tumid below, shortly beaked; anther beaked; pollinia globose, sulcate, strap long slender dilated and forked above, each arm spatulate and with the globose pollinia immersed in their concave tips, gland small oblong. A remarkable plant, put by Lindley into *Cleisostoma*, but I do not find the great gland in the spur under the column. *Hook. f.* Fl. Brit. Ind. vi. 60.

SYN.—*Cleisostoma lanatum*, Lindl. in Journ. Hort. Soc. iv. 264; Walp. Ann. 889.

## 13. *S. longicalcaratum*, Rolfe.

This species was introduced together with *Cypripedium Charles-*

*worthii*, Rolfe, by Messrs. Charlesworth, Shuttleworth & Co., of Heaton, Bradford, with whom it flowered in April last (1894). It belongs to the section *Speciosa* and is allied to *S. compressum*, Lindl., and *S. trichro-mum*. Rchb. f. It has the general habit of the latter, but is a much smaller plant with a straight spur. The flowers are pale pinkish purple, with a bright purple blotch on either side of the lip close to the minute front lobe. The side lobes are also very small, so that the lip is practically reduced to a straight spur, longer than the pedicel, with the three minute lobes guarding the mouth. Burma. *Kew Bulletin* No. 90, 1894.

**14. *S. longifolium*, Hook. f.**

Leaves 6—16 in., peduncle 6—7 in., internodes long, flowers sub-corymbose, midlobe of lip ovate obtuse, sac broad conical with an erect dorsal hairy plate in the cavity.

Tropical Sikkim Himalaya (*l.c. in Hort. Cactif.*). Upper Assam, Mann. Tenasserim, Wallich, &c.

*Stem* very stout. *Leaves*  $1\frac{1}{2}$ —2 in. broad. *Peduncle* with racemes 6—7 in., as thick as a swan's quill, with often a few short lateral branches; bracts annular; flowers crowded  $\frac{3}{4}$  in. diam., golden yellow banded with red on both surfaces. The dorsal plate in the cavity of the lip recalls *Cleistoma*. Hook. f. Fl. Brit. Ind. vi. 62.

SYN.—*Acampe* ? *longifolia*, Lindl. Fol. Orchid. 1.

? *A. multiflora*, Lindl. l. c.

*Vanda longifolia*, Lindl. in Wall. Cat. 7322; Gen. and Sp. 215; in Journ. Hort. Soc. vii. 267; Walp. Ann. vi. 872 C. P. 78.

*V. multiflora*, Lindl. Collect. t. 38.

*Erides regidum*, Smith in Rees. Cyclop.

**15. *S. micranthum*, Lindl. in Wall. Cat. 7300; Gen. and Sp. 220.**

Leaves lorate unequally obtusely 2-lobed, scape stout flowering to the base, racemes very many- and dense-fl., sepals broadly ovate obtuse

3-nerved, petals oblong or lanceolate serrulate, spur of lip shorter than the sepals subtruncate, blade obovate-spathulate with 2 basal calli, lateral lobes broad obtuse.

Tenasserim, *Griffith, Parish.*

*Stem* 6—10 in., curved, as thick as goose-quill or less. *Leaves* 3—5 by  $\frac{3}{4}$ —1 in., narrowed to the base. *Raceme* equalling the leaves; bracts small, broad; flowers about  $\frac{1}{8}$  in. diam.; 3-nerved sepals and petals violet; lip rose-red; column very short; anther very broad, acuminate globose; pollinia strap very short broadly cordate, gland orbicular. *Capsules*  $\frac{1}{3}$  in., subfusiform. *Hook. f. Fl. Brit. Ind. vi. 59.*

Saunders' Refug. Bot. t. 110; C. P. 45.

**16. *S. obliquum***, Lindl. in Wall. Cat. 7304; Gen. and Sp. 223; in Journ. Linn. Soc. iii. 33.

Stem very short stout, leaves broad and long unequally broadly 2-fid, bracts and flowers large, blade of lip fimbriate, disk papillose with a large 2-lobed callus.

Burma; at Taingdong, *Wallich.*

*Leaves* 6—8 by 1—2 in.; flowers 1 in. diam.; sepals and petals narrow, whole-cold., all (in Ic. Wallich) pale yellow, with the lip white speckled with yellow. *Hook. f. Fl. Brit. Ind. vi. 61.*

Rchb. f. Otia Hamb. 42.

SYN.—*Vanda, obliqua*, Wall. MSS.

**17. *S. ochraceum***, Lindl. in Bot. Reg. 1842, Misc. 2.

*Stem* 1—2 ft. *Leaves* 7—9 by 1—1  $\frac{1}{2}$  in. *Panicle* longer or shorter than the leaves, branches distant lax-fid.; flowers  $\frac{1}{3}$ — $\frac{1}{2}$  in. diam.; mid-lobe of lip ovate, crenate, 2-auricled and with fleshy teeth at the base; spur cylindric, as long as the limb, hairy within. *Capsule* 1—1  $\frac{1}{2}$  in. fusiform. Bentham in Gen. Plant. iii. 581, misled by a mixture of specimens of different species, errs in referring *S. lineolatum* to *Cleisostoma maculosum*; it is clearly this plant. *Hook. f. Fl. Brit. Ind. vi. 62.*

Tenasserim, *Griffith.*

SYN.—*S. lineolatum*, Thwaites Enum. 304. *Acampe dentata*, Lindl.

Fol. Orchid. 3; Rchb. f. in Gard. Chron. 1872, 1752; Walp. Ann. vi. 894. *A. Wightiana*, *Var. longipedunculata*, Thwaites l. c. 303.

**18. *S. papillosum***, Lindl. in Bot. Reg. t. 1552 (excl. syn.); Gen. and Sp. 222.

Stem elongate branched scandent, leaves 3—4 in., scape 1—2 in., internodes close, bracts semicircular, midlobe of lip ovate, spur conical pubescent within.

Tenasserim, *Hook. f.*

*Stem* 2—3 ft., as thick as a goose-quill. *Leaves* obliquely notched. *Scape* closely scarred to the base; flowers  $\frac{2}{3}$  in. diam.; ovary very short. *Capsule*  $1\frac{1}{4}$  in., fusiform. *Hook. f.* Fl. Brit. Ind. vi. 63.

Wight. Icon. 1672; "Very like an *Acampe*," *Parish*, C. P. 258.

SYN.—*Acampe papillosa*, Lindl. Fol. Orchid. 2; Walp. Ann. vi. 873.

*Saccolabium carinatum*, Griff. Notul. iii. 354.

*Sarcochilus præmorsus*, Spreng. Syst. Pl. iii. 721, *fid.* Steudel.

*Cymbidium præmorsum*, Roxb. iii. 465.

**19. *S. Pechei***, Rchb. f. in Gard. Chron. 1887, i. 447.

Leaves very broad 7 by 2 in. ligulate obtusely 2-lobed, raceme few-fld., flowers as large as *S. bellinum* and of *calceolare* type, sepals and petals cuneately oblong ochreous spotted with red, lip a cupular spur, side lobes retuse and angular over the transversely triangular midlobe, blade white and yellow, base of the spur spotted with red.

Moulmein, *Peché*.

It appears to be a very distinct large-leaved species of Sect. Calceolaria. *Hook. f.* Fl. Brit. Ind. vi. 66.

***S. ramosum***, see *Cleisostoma ramosum*.

**20. *S. Wightianum***, *Hook. f.*

Leaves 4—6 in., peduncle 1—3 in., internodes very close, midlobes of lip ovate keeled, sac rounded papillose within.

Not given as Burmese by Hooker, but named in Parish's list (*Vanda-acampe Wightiana*). *B. G.*

*Stem* 12—18 in. *Leaves*  $\frac{2}{3}$ — $1\frac{1}{4}$  in. broad. *Scape* very stout ; bracts very broadly ovate, acute ; flowers  $\frac{2}{3}$ —1 in. diam , subcorymbose, yellow barred with crimson, not papillose. *Capsule* 2— $2\frac{1}{2}$  in., fusiform. *Hook. f.* Fl. Brit. Ind. vi. 62.

SYN.—*S. papillosum*, Dalz. and Gibs. Bomb. Fl. 264 (excl. some syn.).

*Acampe Wightiana*, Lindl. Fol. Orchid. 2 ; Thwaites Enum. 303.

*Vanda Wightiana*, Lindl. MSS. ; Wight Icon. 1670 ; C. P. 77 ; Thwaites Enum. 303 ; Walp. Ann. vi. 873.

*V. fasciata*, Gardn. MSS.—Rheede Hort. xii. t. 4.

## KEY TO SPECIES.

### SACCOLABIUM,\* Blume.

Epiphytes ; pseudobulbs O. *Leaves* flat keeled or terete. *Peduncles* lateral ; flowers usually small spicate racemed paniced or subcorymbose. *Sepals* and *petals* adnate to the base of the column, spreading, subsimilar, free. *Lip* sessile at the base of the column usually consisting of a large saccate or conic cylindric spur, small lateral lobes and a small midlobe ; sac or spur not septate within and without a large scale or callus within under the column (except *S. longifolium*). *Column* short, broad, truncate, rarely beaked, foot O ; anther 1- or imperfectly 2-celled ; pollinia 2, entire or 2-partite.

*Schaenorchis* is not British Indian. *Uncifera* I refer to *Saccolabium* ; its character of the incurved spur is insufficient ; and that of the pollinia stipitate on the strap, or rather on the geniculate apex of the strap, though curious, is, considering how variable this organ is in the genus and its allies, not a dependable one for generic purposes. For *Acampe* I can find no characters whatever, and it is difficult to retain it as a section ; its lip is that of sect. *Calceolaria*, as is the subcorymbose or umbellate inflorescence of most of the species.

### Section I. MICRANTHÆ.

\* Stems elongate pendulous ; leaves terete, filiform, or semiterete.  
No Burmese species.

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\* See Appendix A, Genus 61 (includes 62, 63 and 64).

\* \* Stem short or long. Leaves flat or channelled.

† *Spur of lip longer than the sepals.*

No. 8, *S. flavum*; No. 9, *S. fragrans*; No. 10, *S. Helferi*.

† † *Spur of lip shorter than (rarely equalling) the sepals.*

No. 5, *S. buccosum*; No. 12, *S. lanatum*; No. 15, *S. micranthum*.

#### Section II. CALCEOLARIA.

The species of this section want a thorough revision with much better material than is at my disposal.

No. 1, *S. acutifolium*; No. 3, *S. bellinum*; No. 4, *S. bigibbum*; No. 6, *S. calceolare*; No. 11, *S. intermedium*; No. 16, *S. obliquum*; No. 19, *S. Pechei*.

#### Section III. ACAMPE.

The species of this section are very difficult of discrimination in a dried state, and the following diagnoses and citation are not very reliable, owing to imperfection of specimens and vagueness of published descriptions.

\* *Peduncle rather slender; flowers in large panicles. Spur of lip cylindric; midlobe ovate.*

No. 17, *S. ohraceum*.

\* \* *Peduncle very stout simple or very sparingly branched. Lip a hemispheric or conic sac, midlobe reniform.*

No. 14, *S. longifolium*; No. 20, *S. Wightianum*; No. 18, *S. papillosum*.

#### Section IV. PLATYRHIZON.

No Burmese species.

#### Section V. DISTICHA.

No Burmese species.

#### Section VI. SPECIOSÆ.

No. 2, *S. ampullaceum*; No. 7, *S. curvifolium*; No. 13, *S. longicalcaratum*.

#### Section VI. UNCIFERA.

No Burmese species.

**MICROSACCUS,\*** Blume.

\* Small densely tufted epiphytes ; stems densely leafy. *Leaves* distichous, narrow or scalpelliform, fleshy. *Flowers* minute, subsessile or very shortly racemose. *Sepals* and *petals* subequal, widely spreading. *Lip* small, adnate to the base of the column, base broadly saccate ; side-lobes small or O, midlobe broad subentire. *Column* very short, truncate ; anther obtuse ; pollinia 4, distinct, ellipsoid or globose, sessile on the slender strap, gland small or medium-sized. *Capsule* small. *Hook. f.*

1. **M. javensis**, Blume Bijdr. 367.

Leaves equitant scalpelliform, flowers solitary.

Tenasserim ; at Mergui, *Griffith (Kew Distrib. 5244)*. *Helfer (Kew Distrib. 5384)*. *Parish*.

*Stems* 2—4 in., curved,  $\frac{1}{2}$  in. diam. across the leaves. *Leaves* broadly ovate, obtuse, somewhat recurved, wrinkled when dry. *Flowers*  $\frac{1}{8}$  in. diam. almost concealed by the leaves, cellular, white ; bracts scarious, sheathing ; sepals lanceolate ; petals rather narrower ; lip obtusely 3-lobed. *Capsule*  $\frac{1}{4}$  in., sessile, ellipsoid. Description of flower from a drawing by Griffith in Herb. Lindley.

I have seen no authentic Javan specimen, but the Indian plant agrees well with Blume's description. *Hook. f.* Fl. Brit, Ind. vi. 77.

Lindl. Gen. and Sp. 219.

SYN.—*Saccolabium Griffithii*, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 145 ; C. P. 334. In appearance like a *Tmesipteris*, Par.

**RHYNCHOSTYLIS,†** Blume.

Epiphytic, stem stout leafy, pseudobulb O. *Leaves* very thick linear, 2-lobed. *Flowers* in long dense drooping cylindric racemes

\* See Appendix A, Genus 69.

† See Appendix A, Genus 55.



bright coloured. *Sepals* and broader petals obtuse, spreading, constricted at the base. *Lip* adnate to the base of the column, deeply saccate, mouth of sac pubescent within, side lobes O, outer margin produced into a clawed dilated limb.

*Column* short, stout, foot O; rostellum shortly beaked; anther imperfectly 2-celled; pollinia 2, subglobose, 2-cleft, strap filiform gland small. *Hook f.*

1. ***R. retusa***, Blume Bijdr. 286 t. 49.

Leaves deeply channelled keeled præmorse or retuse, raceme drooping, sac cylindric much longer than the limb of the lip.

Tropical Himalaya from Garwhal eastwards to Tenasserim, *Hook. f.*

*Stem* stout, creeping in trees. *Leaves* 6—20 by  $\frac{3}{3}$ —2 in., curved. *Racemes* 4—18 in., bracts broad, obtuse, membranous; flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. diam., white blotched with pink or violet; lateral sepals gibbously orbicular-ovate, obtuse or apiculate, dorsal oblong; petals elliptic obtuse; epichile of lip very variable in size, usually cuniform, entire or emarginate at the tip, disk flat or obscurely channelled. *Capsule* 1—1  $\frac{1}{2}$  in., clavate. Lindley errs in describing the blade of the lip of *Saccolab. guttatum* as lanceolate, which mislead Wight, who founded his *S. Rheedi* on the difference. *Hook. f.* Fl. Brit. Ind. vi. 32—33.

A beautiful distinct species, with a short erect densely leafy stem, long, arcuate, distichous, lorate, persistent channelled leaves, unequally truncate at the ends, bright green with a few parallel lines of dark green extending from base to apex, on the under side. The flowers grow in dense, pendulous, cylindrical, axillary racemes, the ovate sepals and oblong petals white tinted with rose, and dotted with magenta, and the lip with a compressed bluntish spur, and a roundish oblong lamina, ciliated, recurved and emarginate at the tip, of a soft magenta rose. The flowers are produced in July and August and last 3 weeks in perfection. *Williams.*

**Var. *Majus*.** A charming variety in which the colours of the flowers are much the same as in the above, but the whole plant is of much stronger growth, and the flowers and flower-spikes are much larger; the

leaves are longitudinally banded with streaks of light and dark green on both surfaces. *Williams.*

SYN.—*R. præmorsa*, Blume l. c. *R. guttata*, Rchb. f. in Bonpland. ii. 93. *R. Garwalica*, Rchb. f. in Walp Ann. vi. 888. *Saccolab. guttatum*, Lindl. in Wall. Cat. 7308; Gen. and Sp. 220; in Journ. Linn. Soc. iii. 32; Bot. Mag. t. 4108; Wight Ic. t. 1745—6; Dalz. and Gibbs. Bomb. Fl. 263; Hartem. Parad. ii. t. 3; Orchidoph. 1888, 273 (var. *gigantea*); De Vreise Orchid. t. 14; Warner Sel. Orchid. Ser. 2, t. 18; Griff. Ic. Pl. Asiat. 819. *S. præmorsum*, Lindl. l. c. 221. *S. Rheedii*, Wight. Ic. v. 19, *S. retusum*, Fl. des Serres xiv. 191, t. 1463—4. *S. Heathii*, Hort., ex Gard. Chron. 1885, 369. *S. Blumei*, Lindl. Sert. t. 47; in Bot. Reg., 1841, Misc. 55; Ill. Hort. t. 545; Puydt. t. 37; Warner Orchid. Alb. t. 169 and t. 238 (var.); Pescator. t. 21. *S. garwalicum*, Lindl. in Journ. Linn. Soc. iii. 32; Gard. Chron. 1879, 102. *Sarcanthus guttatus*, Lindl. in Bot. Reg. t. 1443. *Ærides guttatum*, Roxb. Fl. Ind. iii. 471; Regel. Gartenfl. 1863, 415. *Æ. retusum*, Swartz in Schrad. Diar. 1799, 130; Willd. Sp. Pl. iv. 130; Grah. Cat. Bomb. Pl. 204. *Æ. spicatum*, Don. Prodr. 31. *Æ. præmorsum*, Willd. l. c. *Limodorum retusum*, Swartz in Nov. Act. Upsal. vi. 80. *Epidendrum retusum*, Linn. Sp. Pl. 1351. *E. Hippium*, Herb. Ham. Rheede Hort. Mal. xii. t. 1.

For ordinary purposes *Saccolabium guttatum* represents the small variety, *S. Blumei* a finer and intermediate state, and Var. *Majus* the largest sort. *B. G.*

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### SARCANTHUS. Lindl.

A genus of Vandeous epiphytes varying much in appearance. Some have the ordinary flat leaf and short stem, and others a long slender stem, and terete or quill-shaped leaves. The flowers are small but highly coloured, on leaf-opposed racemes. The sepals and petals are of a uniform shape and size, spreading; they have a fleshy 3-lobed lip,

jointed with the column and spurred, the spur being partially divided internally. The pollen-masses are of the usual Vandaceous type, but (if the species are all rightly placed) the stipes and gland vary much in form and size. I find in *every* species, situated at the back but upper part of the spur, below the column, a bilobed fleshy appendage or callus. This varies in shape in different species, but is constant in being 2-lobed, and, I think, may be relied upon as a sure and distinguishing character of this genus.

Other genera, hereinafter to be mentioned, have a callus in or near the same part of the spur, but in no case, as far as I have seen, is it 2-lobed. *Parish.*

### 1. *S. appendiculatus*. Hook f.

A species with terete leaves, stem erect, simple or branched, leaves about 4 inches long. Raceme curved and drooping, 15 or 16 inches long, flowers on the last third only,  $\frac{3}{4}$  inch across. Sepals and petals spreading and reflexed, nearly equal, linear-oblong. Lip 3-lobed with a pointed middle lobe and a conical spur. Colour red-brown stripes on a yellowish ground, lip yellow and purple, also striped behind on the spur.

This plant received its name in consequence of a peculiar appendage, "*callo magno tabulari a dorso calcaris projiciente*," Lindl., inside the lip.\* I found the plant at "The Three Pagodas." *Parish.*

Tavoy, *Wallich*. Tenasserim, *Griffith*, *Parish*.

Fl. Brit. Ind. vi. 67.

SYN.—*S. teretifolius*, Rchb. f. in Trans. Linn. Soc. xxx. 136 (not of Lindl.).

*Æ. appendiculatum*, Wall. Cat. 7315; Lindl. Gen. and Sp. 242; C. P. 28.

*Æ. teretifolium*, Bot. Reg. t. 676.

### 2. *S. aspersus*, Rchb. f. in Hamb. Gartenzeit. 1865, 297.

Near *S. Parishii*; leaves ligulate broadly 2-toothed, peduncle long slender, flowers racemed, sepals green, lip purple spotted, sepals ovate

\* See Note at the end of this Genus. *B. G.*

apiculate, petals (?), spur curved with a longitudinal septum, side lobes semi-ovate involute auricled at the isthmus and at the base, midlobe sessile triangular. Burma. *Hort. Soc. Hook. f. Fl. Brit. Ind. vi. 70.*

**3. *S. chrysmelas*, Rchb. f. in Gard. Chron. 1869, 662.**

Leaves broadly lorate unequally 2-lobed, panicle simple, bracts triangular much shorter than the pedicelled ovaries, flowers yellowish, disk of sepals and petals blackish-purple, sepals and subequal petals oblong, side lobes of lip triangular with an ascending awn, midlobe triangular, spur straight conical, septum running from the posticous base of the spur along the anticus and excurrent on the midlobes, callus under the column bicrural, column slender, base peberulous. *Hook. f. Fl. Brit. Ind. vi. 70.*

Tenasserim ; at Moulmein, *Benson ( Hort. Veitch. )*.

*S. paniculatus*, has a 3-fid midlobe of the lip. *Hook. f.*

Lindl. *Illust. of Orchid Pl. t. 9 ; Gen. and Sp. 233 ; C. P. 283.*

***S. densiflorum*, Par. and Rchb. f. see *Cleisostoma spicatum*.**

**4. *S. erinaceus*, Rchb. f. in Bot. Zeit. 1864, 298.**

A pretty fleshy-leaved species with stems only a few inches long. Leaves lanceolate and pointed. Flowers white suffused with pink, having a fleshy incurved pointed lip of a deep rose colour. They hang down in elegant racemes from 3—6 in. The rostellum is prominent : the pods are covered with short rigid hairs. Hence I gave the plant the name of *S. dasycarpon* (shaggy-fruited), not *S. dasypogon* (shaggy bearded) as erroneously stated in the Botanical Magazine, but it pleased Prof. Reichenbach to change the name to its present one, derived from Pliny's name for hedgehog, a name of which I admit the equal fitness with my own, though not a greater. The flower-stem or rachis and the exterior parts of the flower are similarly clothed with hairs. *Parish.*

Tenasserim ; at Moulmein, *Parish.*

Bot. Mag. t. 5630 ; C. P. 149 ; Fl. Brit. Ind. vi. 69.

SYN.—*S. Stowellianus*, Batem. MSS.

**5. *S. filiformis*, Lindl. in Bot. Reg. 1842, Misc. 61.**

Leaves 8—10 in., racemes long lax-fl'd., sepals oblong obtuse, petals smaller and narrower, lip broadly conically saccate, base 2-lobed, side lobes acute incurved, midlobe short broad toothed on each side at the base.

Tenasserim, *Parish*.

*Stem* pendulous, as thick as a duck's quill, terete. *Leaves* distant,  $\frac{1}{6}$  in. diam., obtuse. *Racemes* 6—10 in., curved; bracts minute, ovate; pedicels very short; flowers  $\frac{1}{3}$  in. diam.; sepals and petals dark purple, margins and midrib green; lip fleshy, white, base broad, yellow, midlobe white, sac with a narrow lamina from the base of the midlobe downwards, and a very large-lobed hispid callus below the very broad, thick, yellow column; strap of oblong pollinia rather broad, gland angular. *Hook. f. Fl. Brit. Ind. vi. 66.*

Bot. Mag. t. 4639; Jard. Fleur. 266; C. P. 284. (Wight's Icon. 1684?)

**6. *S. insectifer*, Rchb. f. in Bot. Zeit. 1857, 159.**

Leaves many  $\frac{1}{2}$  by  $\frac{2}{3}$  in. oblong anplexicaul, spikes very short stout few-fl'd., sepals ovate-oblong obtuse, petals oblong, side lobes of lip rounded, midlobe large triangular-ovate fleshy, spur short broadly conical.

Tenasserim, *Parish*.

*Stem* a foot and upwards, robust, scandent, thicker than a goose-quill. *Leaves* subimbricate, obliquely obtusely 2-lobed with sometimes an intermediate apiculus, thickly coriaceous. *Spikes*  $\frac{1}{2}$  in., sessile; bracts small, deciduous; flowers  $\frac{1}{2}$  in. diam., greenish-yellow striped with red-brown; lip white and pink or purple, midlobe acute or acuminate, spur semi-septate, mouth with a pubescent ridge, dorsal callus large; column very short, stout, tip reclinate and with uncinately recurved arms, : anther truncate, pollinia globose didymous, strap short very broad, gland transverse. *Hook. f. Fl. Brit. Ind. vi. 68.*

C. P. 267.

7. *S. laxus*, Rchb. f. in Bot. Zeit. 1886, 378; in Saund. Ref. Bot. t. 109.

Similar in general character to *S. erinaceus*, so much so that one description might almost answer for both. The leaves, however, are more fleshy still, being, indeed, of a very remarkable thickness, about  $\frac{1}{2}$  inch thick and linear, with an oblique termination. They are generally stippled on the under side with greenish purple. The flowers which much resemble those of *S. erinaceus*, have the lip of a deep ruby-red; and a very prominent column and beak, which, together with the outspread sepals and petals, give them the appearance of tiny birds poised in mid-flight. The pollen gland of these two, as of the other flat-leaved species, is very small, and the stipes very long and slender. It seems to be rather rare, and when found by me it has always been on the boughs of small trees overhanging mountain streams. Tenasserim; at Moulmein. *Parish*.

C. P. 153.

8. *S. lorifolius* (*loriforme*). *Parish* MSS.

Leaves very thick curved linear channelled keeled obtusely notched, scape flexuous and rachis of panicle dense-fl. spikes stout, bracts reflexed, lateral sepals broadly obovate, petals more oblong obtuse, side lobes of lip subulate, midlobe ovate concave, spur longer than the sepals.

Tenasserim; at Moulmein. *Parish*.

*Stem* 3—4 in., stout, few-leaved. *Leaves* 4 by  $\frac{1}{2}$ — $\frac{3}{4}$  in., sheath very short. *Peduncle* 4 in., green, sheaths obtuse; spikes 3—4 in., bracts ovate-subulate; sepals and petals yellow with red; spur white, half 2-celled by vertical lamella, dorsal callus didymous; column short; anther short, broad, pollinia didymous, strap not long, gland ovate. Described from an excellent drawing by *Parish*. Habit, spikes and bracts of *Cleisostoma spicatum*, but the flowers are smaller, yellow, and the spur distinctly septate within. *Hook. f.* Fl. Brit. Ind. vi. 69. and Ic. Plant. ined.

I am unable to identify this *Sarcanthus* with Prof. Reichenbach's names. *Parish*.

C. P. 117.

**9. *S. mirabilis*, Rchb. f. in Gard. Chron. 1878, ii. 300.**

Leaves  $5\frac{1}{2}$  by  $\frac{2}{3}$  in. ligulate 2-fid, lobes ligulate obtuse, panicle  $1\frac{3}{4}$  in. elongate slender, branches distant erect, ends racemose, bracts most minute, flowers small yellowish, spur purple, sepals oblong acute dorsal arched gibbous, petals ligulate, lip 3-fid, side lobes short erect oblong acute, midlobe triangular horizontal, spur cylindric semi-curved grooved septate, dorsal callus forked, strap of pollinia oblong bent over the compressed androclinium, pollinia blue on a forked appendage of the strap.

Burma? (*Hort. Hobart.*)

Near *S. Parishii*, with even more remarkable pollinia. The strap of the stipitate pollinia must resemble that of *Saccolab.*, section *Uncifera*. *Hook. f. Fl. Brit. Ind. vi. 70.*

**10. *S. oxyphyllus*, Wall. ex. Lindl. in Bot. Reg. 1840, Misc. 58.**

Leaves 6—12 by  $\frac{1}{2}$ — $\frac{2}{3}$  in. rigid acuminate, racemes short dense-fid. sepals oblong obtuse, petals smaller obovate-oblong, side lobes of lip acuminate, midlobe small ovate, incurved, spur much longer than the sepals subcylindric, obtuse.

Tenasserim; at Moulmein. *Parish.*

*Stem* short. *Leaves* thickly coriaceous, margins recurved, narrowed to both ends. *Raceme* 4—6 in.; bracts minute, acute; flowers  $\frac{1}{4}$  in. diam. dull purple, with yellow disk and margins; spur large, obtuse, septate below the middle, dorsal callus large lobed; column rather long rostellum minute; anther acuminate, pollinia didymous, strap very slender, gland minute. Lindley (Bot. Reg. l. c.) says that *oxyphyllus* is nothing but a narrow-leaved Var. of the Chinese *S. rostratus*, but as noted under *S. secundus* there has been a misapprehension or transference of Wallich's name of *oxyphyllus* by Lindley or Wallich. *Hook. f. Fl. Brit. Ind. vi. 70.*

C. P. 86.

SYN.—? *Clesostoma subulatum*, Blume, Bijdr. 362.

*Angracum pugioniforme*, Klotzsch in Cat. Sem. Hort. Berol.

***S. paniculatus*, Lindl. Illust. of Orch. Plant. t. 9; Gen. and Sp. 233. C. P. 283, sec *S. Chrysomelas*.**

**11. *S. pallidus***, Lindl. in Bot. Reg. 1840, Misc. 78; in Journ. Linn. Soc. iii. 39.

Leaves 10—14 in. lorate flat, panicle very large copiously branched laxly many-fld., sepals and smaller petals oblong obtuse, side lobes of lip triangular acuminate, midlobe a small incurved ovate acute fleshy beak, spur a cylindric obtuse sac.

Burma, *Berkeley*.

*Stem* as thick as the thumb; roots very stout. *Leaves* very coriaceous, 2 in. broad, deeply obtusely 2-lobed. *Panicle* with the stout peduncle 2—3 ft., branches long, slender; bracts at the forks ovate-lanceolate, floral subulate, persistent; pedicel with ovary  $\frac{1}{3}$  in., flowers  $\frac{1}{3}$  in. diam., sepals and petals dark purple edged with yellow; lip white, spur thick-walled, about as long as the sepals, semi-septate longitudinally, dorsal callus 2-lobed; column short, stout, rostellum obscure; anther broad, acute, pollinia oblong, strap dilated above, gland small. *Capsule*  $\frac{2}{3}$  in., ellipsoid or clavate. *Hook. f.* Fl. Brit. Ind. vi. 68.

*SYN.*—*S. racemifer*, Rchb. f. in Walp. Ann. vi. 891; *S. tricolor*, R. f. in Bonpland. ii. 219. *Saccolabium racemiferum*, Lindl. Gen. and Sp. 224; *Arides racemiferum*, Wall. MSS.

**12. *S. Parishii***, Hook. Bot. Mag. t. 5217.

Leaves 4—6 in. lorate keeled unequally obtusely 2-fid, raceme or panicles elongate many and lax-fld., sepals ovate obtuse, petals smaller narrower oblong, side lobes of lip rounded, midlobe broadly ovate, straight or recurved, spur longer than the sepals narrowly conical curved.

Tenasserim; at Moulmein, *Parish*.

*Stem* 1—2 in., roots very stout. *Leaves* few, divaricate, bases closely imbricating. *Racemes* 6—16 in.; bracts minute, ovate acute; flowers  $\frac{1}{6}$  in. diam. golden yellow; sepals and petals striated with red; spur septate below the middle, dorsal callus large; column short; anther acuminate, pollinia didymous oblong shortly stipitate below the tip of the narrowly spatulate strap (as in sect. *Uncifera* of *Saccolabium*), gland minute. *Hook. f.* Fl. Brit. Ind. vi. 69.

C. P. 27.



**S. rutilus**, Par. MSS. ; C. P. 197.

Parish says, "I am unable to identify this *Sarcanthus* with Prof. Reichenbach's names."

**S. teretifolius**, Rchb. f. see *S. appendiculatus*, of Lindl. Gen. and Sp. 234.

**13. S. Williamsoni**, Rchb. f. in Hamb. Gartenzeit. 1865, 333 ; in Gard. Chron. 1865, 674.

A terete-leaved species, but of erect growth, with stem about the thickness of a goose-quill. The racemes slender, simple or branched, flowers rather numerous, small. Sepals and petals pale salmon colour, lip lilac with deep ruby-red side lobes. Tenasserim ; at Moulmein. *Parish*.

Andaman Islands. *Berkeley*.

C. P. 272.

NOTE.—*Sarcanthus appendiculatus*.

This plant received its name in consequence of a peculiar appendage ("callo magno tabulari a dorso calcaris projiciente," Lindley) inside the tip. It was the discovery of this plant in 1856 at "The Three Pagodas," and the observation of this singular appendage, together with the fact that notice of it was taken by Lindley (and so I was enabled unmistakably to identify the species), that led me to pay special attention to similar appendages, and to note their presence or absence, and accurately to draw their varying forms.

The result of my observations is much as follows. In all flat-leaved *Sarcantha* I find them, and always 2-lobed, or in some forms bipartite throughout, generally divaricating upwards. I find them also in *S. teretifolium*, *Williamsoni*, and *Appendiculatus*, but here they differ in shape from those in the flat-leaved species, though similar in the three ; in all of which (though again not *identical* in outline) they are of one common type. The upper part is flat, semicircular, and undivided, resting on a

slightly bilobed base. I find a similar appendage again in *Cleisostoma*, but here it is simply a flat lamina, rounded in outline or more or less quadrate. This, I presume, is the "tooth" to which Lindley alludes in his definition of the genus where he says "calcare *dente* clauso." I further find an appendage agreeing with that of *Cleisostoma* in a small and obscure plant which Prof. Reichenbach has named *Saccolabium bipunctatum* (see *Cleisostoma bipunctatum*), but which I have ventured to name *Ceratochilus*; and indeed, whether this genus of Blume be a good one or not, I cannot but think still that it is a *Ceratochilus* according to his definition, and that it may even be his *C. biglandulosus*, so remarkably does it agree with his characters at all points. Lastly, the genera *Thrixsperum* and *Appendicula* are also furnished with appendages, but they are either of a different character or in a different position. *C. Parish.*

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### KEY TO SPECIES.

#### SARCANTHUS,\* Lindl.

Characters of *Saccolabium*, but spur with a dorsal usually 2-lobed callus or an erect plate within, inserted under the column, and with the cavity more or less divided by a vertical septum.

But for the inconvenience attending the substitution of a new generic name for the numerous species of this genus, I should unhesitatingly unite it to *Cleisostoma*, and both to *Saccolabium*. The only character whereby its species can be distinguished is the more or less septate cavity of the spur, often a very obscure one, and almost inappreciable when the septum is reduced to a mere ridge.

\* Leaves elongate, filliform.

No. 1, *S. appendiculatus*; No. 5, *S. filiformis*; No. 13, *S. Williamsi*.

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\* See Appendix A, Genus 65.

\* \* Leaves flat or channelled.

† Stem elongate, scandent or pendulous.

No. 6, *S. insectifer*; No. 11, *S. pallidus*.

† † Stem short or O.

No. 4, *S. erinaceus*; No. 7, *S. laxus*; No. 8, *S. lorifolium*; No. 10, *S. oxyphyllus*; No. 12, *S. Parishii*.

Species unknown to me.

No. 2, *S. aspersus*; No. 3, *S. chrysomelas*; No. 9, *S. mirabilis*.

### **SARCOCHILUS**, Browne.

Epiphytes, stem short or long, pseudobulbs O. Leaves distichous, or O at flowering time. *Flowers* racemose or spicate. *Sepals* spreading; lateral adnate by a narrow base to the base of the column, or by a broad base to its foot, and sometimes to the lip also. *Petals* usually narrower. *Lip* sessile or clawed, very varied in form, side lobes small or large fleshy or petaloid, middle sometimes reduced to a pubescent callus, disk very various with often a callus or spur within. *Column* short or long, foot more or less produced; anther 2-celled; pollinia, 2, sulcate, or 4 in pairs, strap short broad. *Capsule* usually long strict slender. Hook f.

In this section I have followed Hooker. Parish in the arrangement generally adopted in this book gives *Thrixspermum* and *Cammarotis* as separate genera, and I have given his definitions of them at the end of the genus. B. G.

#### **1. *Sarcochilus arachnites*, Rchb. f. in Walp. Ann. vi. 498.**

Stem elongate, leaves loriform, peduncles shorter than the leaves, sepals and petals linear-lanceolate caudately acuminate 3—5-nerved, lip saccate, side lobes falcate, midlobe tongue-shaped laterally flattened-obtuse puberulous. •

Tenasserim and Tavoy. *Wallich, Parish.*

*Stem* 6—12 in., curved or tortuous, internodes short; roots most numerous and long. *Leaves* 3—6 by  $\frac{1}{2}$ — $\frac{2}{3}$  in. *Peduncles* many,

2—4 in., solitary or in pairs, bracts  $\frac{1}{6}$  in., sepals and petals  $1\frac{1}{2}$  in., yellow; lip mottled with red; column very short; pollinia oblong, curved, strap very small, quadrate, gland still smaller, lunate. *Capsule* 2—2½ in. *Hook. f. Fl. Brit. Ind. vi. 41.*

SYN.—*S. serraeformis*, Rchb. f. l. c.

*Dendrocolla arachnites*, Blume Bijdr. 287, t. 67.

*Erises arachnites*, Lindl. Gen. and Sp. 238.

*Liparis serraeformis*, Lindl. in Wall. Cat. 1946; Gen. and Sp. 33 (excl. Ceylon Plant).

*Thrixspermum arachnites*, Rchb. f. Xen. Orch. ii. 121; C. P. 246.

## 2. *S. hirtus*, Benth. in Gen. Plant. iii. 576.

Leaves lorate very thick straight horizontal, raceme pubescent, lip a conical sac with short acute 2-toothed side lobes and a large double calus below the column within.

Tenasserim, *Parish.*

*Stem* very short. *Leaves* 3—5 in., very thick. *Racemes* 1—3 in., drooping; peduncle and rachis slender; bracts short, broad, membranous; flowers  $\frac{1}{3}$ — $\frac{1}{2}$  in. diam., pink, pubescent; lateral sepals adnate to the obscure foot of the column and base of lip; petals narrower, falcate, obtuse; lip white and pink; column white; anther purple long-beaked, 2-celled; pollinia 4, oblong, stipitate in pairs on the spathulate end of a very long slender strap, gland minute. *Capsule* not seen. Lindley errs in describing the lip as solid with a pair of horns at base; it is a conical cup, the mouth oblong, and the horns are the 2-fid side lobes which appear to rise out of the cup. The callus below the column is that of *Cleisostoma* and the strap and stipitate pollinia are those of *Saccolab. § Uncifera*. *Hook. f. Fl. Brit. Ind. vi. 35.*

SYN.—*Stereochilus hirtus*, Lindl. in Journ. Linn. Soc. iii. 58.

## 3. *S. hystrix*, Rchb. f. in Walp. Ann. vi. 500.

Peduncle about as long as the short loriform leaves, bracts erect subulate-lanceolate, side lobes of the lip glandular, hairy.

Tenasserim; at Mergui. *Griffith (Kew Distrib. 5232); Parish.*

*Stem* 1—3 in. *Leaves* 2—3 by  $\frac{1}{3}$ — $\frac{2}{3}$  in., obtusely 2-lobed; sheaths ribbed. *Peduncle* 2—3 in., stout or slender, 2—3-sheathed; spike  $\frac{1}{4}$ — $\frac{1}{3}$  in.; flowers white; sepals and petals  $\frac{1}{4}$  in. long, lanceolate, acuminate; lip stoutly clawed, spotted with yellow, base saccate; side lobes triangular, midlobe truncate glandular-pubescent within; column very short; anther broad; pollinia 2 bipartite, or 4 in very unequal pairs, strap broad, gland rounded. *Capsule*  $2\frac{1}{2}$ —4 in., linear, straight. *Hook. f. Fl. Brit. Ind. vi. 38—39.*

SYN.—*Dendrocolla hystrix*, Blume, Bijdr. 291.

*Ærides hystrix*, Lindl. Gen. and Sp. 242.

*Thrixspermum hystrix*, Rchb. f. in Trans. Linn. Soc. xxx. 145; C. P. 285.

*Grosourdyia hystrix*, Rchb. f. Xen. Orch. ii. 123; in Bot. Zeit. 1864, 297.

4. ***S. leopardinus***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 145 (*Thrixspermum*).

Stem short, raceme few-fl. much shorter than the leaves, sepals broadly oblong, petals much smaller, lip sessile, side lobes wing-like oblong obtuse, midlobe small, spur large urceolate.

Tenasserim; at Moulmein. *Parish.*

*Stem* 2—3 in., curved. *Leaves* 4—6 by  $\frac{3}{4}$ —1 in., lorate, fleshy, narrowed from the middle downwards, obtuse, many-nerved. *Peduncle* very stout; lower sheaths annular; bracts short, broad, obtuse; flowers yellow spotted with purple; sepals  $\frac{1}{6}$  in. long, obtuse, lateral inserted on the long foot of the column, dorsal smallest; lip with a large dorsal callus over the mouth of the descending fleshy round-based spur; midlobe recurved, broadly ovate, caruncled, white spotted with purple; anther depressed, pollinia broadly pyriform, sessile on a small gland. *Hook. f. Fl. Brit. Ind. vi. 38.*

C. P. 269.

5. ***S. luniferus***, Rchb. f. in Gard. Chron. 1868, 786 (*Thrixspermum*); Bot. Mag. t. 7044.

Racemes elongate, many-fl. ; flowers yellow spotted with purple.

Tenasserim ; at Moulmein. *Parish*.

Except in the colour of the flowers I can find no difference between this and *S. usneoides* (Nepal and Sikkim), the authority for the colours of which latter is a drawing made by Wallich's artists during his visit to Nepal, and another in Sikkim. Parish observes that very small leaves are sometimes produced and these have been seen in Kew Gardens. *Hook. f. Fl. Brit. Ind. vi. 37*.

C. P. 55.

**6. *S. Merguensis*, Hook. f. Ic. Plant. ined.**

Stem short, peduncles much shorter than the small linear-oblong leaves, bracts imbricate erect, capsule 1—1½ in. linear terete beaked.

Tenasserim ; at Mergui. *Griffith (in Herb. Lindl.)*.

A remarkable little species, with the stem ½ in. long, clothed with the imbricating bases of the distichous leaves, which are about an inch long. *Peduncle* ½—1 in., filiform ; *raceme* ½ in. ; bracts ovate, acuminate. *Capsule* shortly pedicelled, ⅙ in. diam., striate, beak ½ in. *Hook. f. Fl. Brit. Ind. vi. 40*.

**7. *S. muscosus*, Rolfe.**

This species was sent from the Andaman Islands, together with *Phalænopsis tetraspis* Rchb. f., by E. H. Man, Esq., and flowered in the Kew collection last November. It is allied to *S. hirtulus*, Hook. f. (Ic. Pl. t. 2121). The flowers are dull yellow, with red-brown spots and streaks round the mouth of the sac, which organ is light yellow at the tip, and a light yellow column, the foot of which is spotted and streaked with red-brown on a dull yellow ground. *Kew Bulletin, No. 73, 1893*.

Andaman Islands. *Man*.

**8. *S. muriculatus*, Rchb. f. in Gard. Chron. 1881, ii. 198.**

Leaves 6—9 in. lorate, racemes very short, peduncle and rachis viscid, lip shortly clawed saccate, side lobes broadly ovate, obtuse ; midlobe small obtusely 2-partite pubescent.

Andaman Islands. *Kurz, Berkeley*.

*Stem* 6—8 in., stout, rooting below. *Leaves* 1 in. broad, obliquely notched or 2-lobed, lobes rounded. *Scape* with raceme  $2\frac{1}{2}$ —3 in., strict; bracts broad, obtuse; flowers about  $\frac{1}{2}$  in. diam., light yellow, sweet-scented; sepals and petals with two purple bars; column rather long; anther ovate, pollinia globose, strap short, flat, gland small. The lip is that of Sect. II. *Hook. f.* Fl. Brit. Ind. vi. 34.

**9. *S. obtusus*, Benth. MSS.**

May be described as a pale variety of the following, distinguished by having the rostellum or beak turned up at right-angles to the column. *Parish.*

Tenasserim, at Moulmein. *Griffith, Parish.*

Fl. Brit. Ind. vi. 36.

SYN.—*Cammarotis obtusa*, Lindl. in Bot. Reg. 1884, Misc. 73 (? 71); Walp. Ann. 881 : C. P. 148.

**10. *S. purpureus*, Benth. MSS.**

A beautiful upright growing plant, with distichous oblong-linear emarginate leaves 3—4 in. long. It produces its flower-spikes, which are about 8 in. long and many-fl'd., from the side of the stem; the blossoms are pale rose-coloured, the lip being of a deeper rosy crimson. *Williams.*

It must be rare, as I was twenty years in Burma before I found it, and then only one plant. It was discovered in Silhet many years ago. *Parish.*

Fl. Brit. Ind. vi. 36.

SYN.—*Micropera pallida*, Wall. Cat. 7321 (in part).

*Cammarotis purpurea*, Lindl. in Wall. Cat. 7329; Gen. and Sp. 219; Sert. Orch. t. 19; in Journ. Linn. Soc. iii. 37; Paxt. Mag. Bot. vii. t. 25, with tab., C. P. 345.

*C. rostrata*, Kchb. f. in Walp. Ann. vi. 881.

*Ærides rostratum*, Roxb. Fl. Ind. iii. 474.

**11. *S. Roxburghii*, Hook. f.**

Raceme long-peduncled, decurved, rather dense, flowers cream-white,

lip slipper-shaped laterally compressed, side lobes large rounded, sac with an exerted spine under the tip.

Tenasserim ; at Mergui, *Griffith* (*Kew Distrib.* 5241). *Helper* (*K.D.* 5254).

*Stem* 2—3 ft. *Leaves* 2—3 by  $\frac{1}{3}$  in., tip rounded notched. *Peduncle* with raceme longer than the leaves ; bracts persistent ; flowers many,  $\frac{1}{3}$  in. diam., sepals and petals as in *S. purpureus* but nearly white ; beak of column straight. *Hook. f.* Fl. Brit. Ind. vi. 36.

SYN.—*Micropera pallida*, Lindl. in Bot. Reg. under t. 1522 ; in Wall. Cat. 7321 (in part) ; Gen. and Sp. 219.

*Camarotis pallida*, Lindl. in Journ. Linn. Soc. iii. 37 ; C. P. 46.

*Erides pallidum*, Roxb. Fl. Ind. iii. 475 (not of Lindley).

**12. *S. sillemianus*, Rchb. f. in Gard. Chron. 1882, i. 524.**

Habit of *Vanda teres*, leaves slender elongate terete, peduncle 2-fid., bracts very short triangular, flowers milk-white suffused with yellow, mentum long, dorsal sepals elliptic, lateral cuneate-oblong, petals obtusely rhomboid, lip erect 3-fid, spur corniform nearly as long as the pedicel of the ovary, side lobes subquadrate striped with purple, midlobe shorter thick retuse 4-grooved, white outside with two purple blotches, yellow within, calli O, column short thick, anther inappendiculate. Burma? *Hook. f.* Fl. Brit. Ind. vi. 42.

**13. *S. suaveolens*, Hook. f.**

Leaves lorate acutely 2-fid, raceme elongate glabrous, side lobes of lip falcate, midlobe decurved with a recurved tip.

Tenasserim ; at Moulmein. *Parish*.

*Stem* slender, scandent. *Leaves* 3—5 by  $\frac{2}{3}$ — $\frac{3}{4}$  in., many-nerved, coriaceous, base contracted. *Racemes* 3—6 in., shortly peduncled, lax-fid. ; rachis stout ; bracts small, rounded ; flowers  $\frac{1}{3}$ — $\frac{1}{2}$  in. diam., yellow speckled with red, very fragrant ; lip rather laterally compressed ; midlobe light purple or speckled with pink. *Hook. f.* Fl. Brit. Ind. vi. 33—34.

SYN.—*Erides suaveolens*, Roxb. Fl. Ind. ii. 473.



*Ornitharium striatulum*, Lindl. in Paxt. Fl. Gard. 473 (figure bad).

*Ornithochilus striatulus*, Hort. Calcutt.

*Thrixspermum teres*, Rchb. f. Xen. Orch. ii. 121, 123 t. 140 (excl. syn.) ; in Trans. Linn. Soc. xxx. 136, C. P. 212.

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#### CAMAROTIS, Lindley.

A small genus of slender climbing epiphytes with long narrow linear leaves, and small flowers on leaf-opposed racemes. They have a long rostellum, and a fleshy incurved lip, and have much the appearance of *Sarcanthus*. *Parish*.

They succeed best grown in sphagnum and suspended in baskets, and require care to grow them well. They may be planted either in pots or baskets with moss, but the latter are preferable. They should have plenty of moisture over the roots and leaves during the period of growth, but need very little rest, and should never be allowed to shrivel. *Williams*.

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#### THRIXSPERMUM, Lowe.

This genus consists of a small number of caulescent epiphytes with distichous leaves, short woody stems, which emit a great number of wiry roots. The flowers are small and few on a rachis, which assumes various shapes, sometimes round, sometimes flat, but always more or less swollen and fleshy. The flowers are marked by a 3-lobed lip with a thick and solid middle lobe, articulated with the prolonged mentum or base of the column. The pods are long and cylindrical, open longitudinally by one valve, and are full of silky hair in which the seeds are enveloped. *Parish*.

## KEY TO SPECIES.

## SARCOCHILUS. \*

A polymorphous genus, no doubt to be dismembered when better known. The following attempt to group the Indian species possibly indicates the lines upon which some of the genera may be established.

A. Flowers loosely inserted all round the rachis of a more or less elongated raceme or spike.

\* *Lateral sepals inserted by a narrow base to the base of the column, or base of the column and sides of the lip. Foot of column 0 or very short.*

## Section I. PTEROCERAS, Hasselt.

No. 8, *S. muriculatus* ; No. 13, *S. suaveolens*.

## Section II. STEREOCHILUS, Lindl.

No. 2, *S. hirtus*.

## Section III.

No Burmese species.

## Section IV. MICROPERA, Lindl.

No. 9, *S. obtusus* ; No. 10, *S. purpureus* ; No. 11, *S. Roxburghii*.

\* \* *Lateral sepals inserted by a very broad base to the elongate foot of the column.*

## Section V. CHILOSCHISTA, Lindl.

No. 5, *S. luniferus*.

## Section VI.

No. 4, *S. leopardinus*.

B. Flowers in very short spikes at the apex of a slender scape, bracts persistent ; imbricate.

## Section VII. FORNICARIA.

No. 3, *S. hystrix* ; No. 6, *S. merguensis*.

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\* See Appendix A, Genus 56.

C. Flowers distichous on a compressed rachis, which is pectinate from the uniform persistent laterally compressed fleshy bracts.

Section VIII. CUCULLA.

No. 1, *S. arachnites*.

Section IX. RIDLEYA.

No Burmese species.

**CLEISOSTOMA**, Blume.

A genus of epiphytal plants with leafy stems clothed with distichous spreading leathery leaves, usually flat, but sometimes terete, and the lateral peduncles bearing simple or branched racemes, the flowers for the most part small. Requires the same treatment as *Ærides*. *Williams*.

1. **C. Andamanicum**, Hook. f.

Leaves 4—6 by  $\frac{1}{2}$ — $\frac{3}{4}$  in. lorate, peduncle equalling or exceeding the leaves, side lobes of lip short truncate, midlobe very short reniform, spur cylindric.

South Andaman Islands *Kurz*.

*Stem* as thick as a goose-quill. *Leaves* very coriaceous, recurved, obtusely unequally 2-lobed. *Peduncle* 5—7 in.; sheaths annular, bracts minute, broad; flowers  $\frac{1}{4}$  in. diam., sepals and petals obovate-oblong, pale greenish-yellow with a purple band within the margin; lip yellow, spur spotted with red, dorsal callus retuse; column very short, rostellum large, prominent; anther ovate, acuminate, strap of globose pollinia slender, gland medium-sized. *Hook. f. Fl. Brit. Ind. vi. 71.*

2. **C. bicuspidatum**, Hook. f.

Leaves 3—4 by  $\frac{1}{2}$ —1 in. acutely 2-fid, raceme lax-fl'd. much shorter than the leaves, sepals orbicular-ovate obtuse, petals oblong-obovate, side lobes of lip plicate truncate, midlobe very stout ovate acute incurved, spur cylindric longer than the sepals obtuse.

Tenasserim. *Parish (Ic. in Hort. Calcutt.).*

*Stem* very short. *Leaves* flat, narrowed towards the base, lobes very

acute, often unequal, the longer  $\frac{3}{4}$  in. *Peduncle* with 5—6-fl. simple or branched raceme 2—5 in.; bracts small, ovate; flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. diam., spreading or reflexed; sepals and petals yellowish-green, with a median stripe; lip white, speckled or flushed with rose, spur longer than the sepals, mouth infundibular with a thickened ridge, dorsal callus 2-lobed; column very short, rostellum long decurved; anther beaked; strap of globose pollinia dilated upwards, tip rounded produced beyond the pollinia, margins recurved, gland minute. *Hook. f. Fl. Brit. Ind. vi. 75.*

### 3. *C. bipunctatum*, Hook. f.

Stem slender scandent, leaves 4—6 by  $\frac{1}{2}$  to  $\frac{2}{3}$  in., subacute, peduncle very short, 1—2-fl. side lobes of lip small subfalcate, midlobe large ovate-lanceolate, spur very small, incurved, obtuse, saccate.

Tenasserim; at Moulmein. *Parish.*

*Stem* about as thick as a duck's quill. *Leaves* lorate, laterally notched towards the tip; costa stout beneath. *Flowers* about  $\frac{1}{4}$  in. diam., yellow and purplish; bracts obscure; sepals oblong-lanceolate, acute, 3-nerved, and linear-oblong 1-nerved petals falcate; midlobe of lip longer than the sepals, white, 3-nerved with a basal callus, dorsal scale membranous toothed; column very short; anther short, very broad, strap of subglobose pollinia linear, gland small. I have seen only a very small specimen. Reichenbach, though describing the scale in the spur places this in *Saccolabium*. *Hook. f. Fl. Brit. Ind. vi. 73.*

*SYN.*—*Saccolabium bipunctatum*, Par. and Rchb. in Trans. Linn. Soc. xxx. 145; C. P. 280.

### 4. *C. crassifolium*, Lindl. in Paxt. Fl. Gard. iii. 125, t. 99.

Leaves 8—10 in. obtuse keeled, peduncle long stout branched, spikes recurved, lip with a pubescent ridge at the mouth of the cylindric spur, side lobes rounded, midlobe broadly ovate, lateral angles acute recurved.

Tenasserim? (*Hort. Veitch.*)

*Stem* as thick as the thumb. *Leaves* recurved, very thick, channelled above. *Peduncle* equalling the leaves; flowers  $\frac{1}{3}$  in. diam.; sepals oblong, obtuse, and petals green and spotted; lip rose-coloured, mouth

of spur closed by the thickened ridge, disk of midlobe thickened ; dorsal callus compressed, decurved ; column very short ; anther acuminate, pollinia 4, subglobose, strap linear, gland small. *Hook. f. Fl. Brit. Ind. vi. 72.*

Jard. Fleur. iv. t. 397 ; Walp. Ann. vi. 889 ; Lindenia iii. t. 139.

This distinct plant has close set thick leathery leaves, much recurved, resembling those of a *Vanda* ; it produces its nodding panicles of sea-green, rosy lipped flowers from the axils of the leaves, and although the individual flowers are small it is a charming plant. Moulmein. *Williams.*

**C. Dawsonianum**, see *Trichoglottis Dawsoniana*.

**C. lanatum**, see *Saccolabium lanatum*.

**5. C. ramosum**, *Hook. f.*

Stem short, leaves loriform obliquely 2-lobed, panicles broad, sepals obovate equalling the conical spur, side lobes of lip very small, midlobe triangular-ovate obtuse, disk at base and short spur within pubescent.

Burma ; on the Attaran river, *Wallich* ; Moulmein, *Parish*.

*Stem* 1—3 in. *Leaves* 3—5 by  $\frac{1}{3}$ — $\frac{1}{2}$  in. *Panicle* erect ; bracts minute ; flowers  $\frac{1}{6}$  in. diam. buff, or yellowish flushed or faintly blotched with red, or dull red with green margins ; sepals and smaller obovate ; petals 3-nerved ; lip white flushed with pink or banded with yellow ; dorsal scale in spur erect 2-fid, pubescent ; column very short, broad ; anther short very broad, pollinia (4, 2 very small, *Clarke*), strap dilated upwards and suddenly contracted at the tip. *Capsule*  $\frac{1}{4}$  in. fusiform. Wallich's specimens from Burma have very narrow leaves. *Hook. f. Fl. Brit. Ind. vi. 72.*

SYN.—*Saccolabium ramosum*, Lindl. Gen. and Sp. 224 ; Wall. Ic. t. 654 ; C. P. 29.

*S. flexuosum*, Lindl. in Journ. Linn. Soc. iii. 36.

*Ecceclades flexuosa*, Lindl. in Wall. Cat. 7333 : Gen. and Sp. 236 ; C. P. 261.

*Erides ramosum*, Wall. MSS.

6. *C. spicatum*, Lindl. in Bot. Reg. 1847, under t. 32.

Leaves 4—8 by  $\frac{1}{2}$ —2 in., spike stout simple dense-fl., bracts ovate-subulate deflexed, side lobes of lip broad rounded, midlobe small ovate fleshy, spur contracted above the inflated 4-lobulate base.

Tenasserim ; at Moulmein, *Parish*.

*Stem* as thick as the middle finger in Penang, more slender in Moulmein. *Leaves* oblong or linear-oblong, broadly unequally 2-lobed. *Spike* decurved or pendulous ; flowers  $\frac{1}{8}$  in. diam. glabrous or subfurfuraceous ; sepals and petals broad, dull red with a pale central band ; lip yellowish flushed with red, midlobe incurved, spur sometimes transversely septate towards the base, dorsal callus forked ; column very short, rostellum short ; anther beaked, strap of globose pollinia slender, dilated upwards, gland small. The spur is like that of *Saccolab. buccosum*, *Hook. f.* Fl. Brit. Ind. vi. 72—3.

SYN.—*Sarcanthus densiflorus*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 136 ; C. P. 194.

*Saccolabium densiflorum*, Lindl. in Wall. Cat. 7311 ; Gen. and Sp. 220 ; in Bot. Reg. 1838, Misc. 56.

*Ærides densiflorum*, Wall. MSS.

7. *C. Wendlandorum*, Rchb. f. in Otto and Dietr. Allgemein. Gartenzeit. 1856, 219.

Leaves 6—10 by 1—1 $\frac{1}{2}$  in., broadly lorate, raceme simple or branched many-fl., sepals obovate-oblong, petals narrower, side lobes of lip obscure rounded, midlobe small orbicular fleshy, spur short inflated.

Tenasserim, *Parish* ; Andaman Islands, *Berkeley*.

*Stem* 1— $\frac{1}{2}$  in., very stout, roots fascicled. *Leaves* coriaceous, 2-lobed, nerveless, midrib beneath slender. *Raceme* or panicle 4—6 in.; bracts obscure, flowers  $\frac{1}{10}$  in. broad, yellow, papillose ; spur very short broad truncate, dorsal scale semi-circular erose, column very short, rostellum beaked ; anther broad, strap of globose pollinia linear, gland small. Capsule (in Cachar) 1 in., linear-oblong. Named after

the two Wendlands of Herrenhausen, father and son. *Hook. f. Fl. Brit. Ind. vi. 74.*

C. P. 93.

SYN.—*C. Callosum*, Rchb. f. in Bonpland. (not of Blume).

*Pomatocalpa spicatum*, Kuhl. and Hasselt. ex. R. f. in Otto and Dietr. Allgemein. Gartenzeit. l. c.

### KEY TO SPECIES.

#### CLEISOSTOMA, \* Blume.

Differs from *Sarcanthus* only in the spur not being septate, and from *Saccolabium* in having a dorsal scale or callus within the spur beneath the column.

Under *Sarcanthus* I have given my reason for not bringing that genus under this; to which I may add that if both were brought under *Saccolabium*, the result would be perhaps more satisfactory still. There are no characters of habit or habitat whereby the three can be distinguished, and the structural are very minute and often obscure. In *Cleisostoma* and *Sarcanthus* the dorsal appendage within the spur is either a 2-lobed callus or a thin scale, suggesting the propriety of rearranging the species of both genera by this character, but it is one so difficult of accurate observation in dried specimens that I hesitate to adopt it.

\* *Stem more or less elongate. Peduncle stout, usually longer than the leaves, branched, erect; flowers in short spikes or racemes terminating the branches (as in Sarcanthus pallidus).*

No. 1, *C. Andamanicum*; No. 4, *C. Crassifolium*.

\*\* *Stem short Peduncle slender; flowers scattered on the slender branches of the panicle.*

No. 5, *C. ramosum*.

\*\*\* *Stem usually elongate. Peduncle slender or stout, rarely branched, usually shorter than the leaves.*

No. 3, *C. bipunctatum*; No. 6, *C. spicatum*.

\* See Appendix A, Genus 66.

\* \* \* \* *Stem very short. Leaves subradical. Peduncle and raceme or spike much shorter than the leaves.*

No. 2, *C. bicuspidatum*; No. 7, *C. Wendlandorum*.

### ACRIOPSIS, Reinwdt.

Pseudobulbous epiphytes. Bulbs aggregate, about the size of a hazel nut, terminated by 2 long slender linear pointed leaves. Flowers numerous, very small, in racemes or panicles on a long slender curved radical stem. They are remarkable for being tetramerous, *i.e.*, the perianth has only 4 segments, 2 sepals and 2 petals. Pollen-masses 2 fusiform. *Parish*.

#### 1. *A. Indica*, Wight. Ic. t. 1748 (bad).

Has almost colourless pale-green flowers, and is more striking when in fruit. It pods freely, and the pods are of the size of a currant and golden yellow. Flowers in a panicle. Tenasserim. *Parish*.

Walp. Ann. vi. 492; Fl. Brit. Ind. vi. 79; C. P. 76.

#### 2. *A. Javanica*, Reinwdt. in Flora. Literat. 1825, ii. 4; in Syllog. Ratisb. 1828.

Tenasserim, *Parish*.

Side lobes of lip broad rounded or sub-triangular, midlobe very small clawed oblong concave claw lamellate. *Leaves* 4—6 by  $\frac{1}{3}$ — $\frac{1}{2}$  in. 2-dentate. *Scape* 6—18 in., simple or branched; pedicels  $\frac{1}{6}$  in., capillary; sepals  $\frac{1}{4}$ — $\frac{1}{2}$  in. white with purple tip and central broad or narrow band; petals subsimilar; lip white with a purple band and lamella. *Capsule*  $\frac{1}{2}$  in., broadly ellipsoid. *Hook. f.* Fl. Brit. Ind. vi. 79.

Tenasserim, *Parish*.

Blume Bijdr. 377; Lindl. Gen. and Sp. 140, Walp. Ann. vi. 492; C. P. 299.

SYN.—*A. picta*. Lindl. in Bot. Reg. xxix, Misc. 105.



*A. Griffithii*, Rchb. f. in Bonpland ii. 92 ; Walp. l. c.

*A. Crispa*, Griff. Notul. iii. 333 ; Ic. Plant. Asiat. t. 318.

? *Spathoglottis* ? *trivalvis*, Wall. Cat. 3742 : , Lindl. Gen. and Sp.

120.

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### KEY TO SPECIES.

ACRIOPSIS, \* Reinwdt.

Epiphytes ; pseudobulbs clustered, 1—3-leaved. *Leaves* flat, linear, not plaited. *Scape* from the base of the bulb, slender, simple or branched ; raceme lax-flid. ; bracts small acute. *Sepals* narrow spathulately obovate, obtuse, dorsal arched, lateral connate placed under the lip. *Lip* adnate to the column above its middle, spreading, more or less 3-lobed, disk with 2 short erect lamellæ on the mesial line. *Column* incurved with 2 styliform horizontal or decurved processes on each side of the stigma, and a cucullate top concealing the anther ; rostellum sub-erect, acute ; anther membranous, 2-celled ; pollinia 2 or 4 in 2 pairs, narrowly pyriform attached by strap to a small gland.

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### THELASIS, Blume.

Pseudobulbous epiphytes. Bulbs terminated by a single leaf. Flowers very small on a radical scape. Pollen-masses 8, on a long slender stipes, with a narrow elongated gland. Worthless obscure plants from the ordinary point of view, but highly interesting from the botanical standpoint. *Parish*.

#### 1. *Thelasis carinata*, Rchb. in Trans. Linn. Soc. xxx. 137.

In the absence of flowers it is impossible to say what species this may be ; it differs greatly from the fig. of Blume's *T. carinata* (from

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\* See Appendix A, Genus 71.

Java) in its small size, slender scape, short decurved raceme, and bracts, in all which, as in foliage, it closely resembles *T. decurva*, and is nearer to the Moluccan *O. micrantha*, Brong. (in Duperrey Voy. Bot. 198, t. 37B.) than to *T. carinata*. *Hook. f.* Fl. Brit. Ind. vi. 88 (among doubtful species).

? of Blume Bijdr. 385 and Lindl. Gen. and Sp. 253.

Given as a doubtful species by Hooker with no habitat named; given in Parish's list with above references, C. P. 171. *B. G.*

## 2. *T. pygmæa*, Lindl. in Journ. Linn. Soc. iii. 63.

Scape 1—2 in. longer than the solitary linear leaf, spike very short lax-fl., lip ovate acute contracted towards the tip.

Tenasserim; at Moulmein. *Parish.*

*Pseudobulbs*  $\frac{1}{2}$ — $\frac{2}{3}$  in. diam. *Scape* very slender, curved; spikes  $\frac{1}{4}$ — $\frac{1}{2}$  in. long; bracts ovate, acuminate; flowers  $\frac{1}{10}$  in. long; dorsal sepal ovate-lanceolate acute, lateral linear-oblong; lip 3-nerved, with rounded sides from the middle to the base; rostellum 2-fid. *Hook. f.* Fl. Brit. Ind. vi. 86.

Par. and Rehb. f. in Trans. Linn. Soc. xxx. 145; Walp. Ann. vi. 923; C. P. 108.

SYN.—*Euproboscis pygmæa* Griff. in Calc. Journ. Nat. Hist. v. 371, t. 72 (? 26); Wight. Ic. t. 1732.

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## KEY TO SPECIES.

### THELASIS,\* Blume.

Epiphytes, with either small 1—2-leaved pseudobulbs, or with short compressed stems clothed with equitant leaf sheaths. *Leaves* oblong or linear-oblong flat, or loriform and jointed on the sheath. *Scape* from the base of the pseudobulb, or lateral on the stem, with

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\* See Appendix A, Genus 74.

1—3 small sheaths ; flowers very minute, spicate, cellular. *Sepals* connivent, dorsal flat, lateral concave keeled or winged. *Petals* narrow, membranous. *Lip* sessile at the base of the column, erect, ovate or oblong. *Column* very short, sessile, foot O ; rostellum terminal, large, erect ; anther elongate, dorsal, erect, base 2—4-celled ; pollinia very minute, globose, attached by long threads to the tip of the rostellum, gland small. *Capsule* very small, turgidly ovoid.

I am not well satisfied as to the character of lateral sepals in this genus, as to their being winged or not ; the sepals are very soft, and their exact structure not very clear in specimens that have been dried, and again moistened.

#### Section I. EUTHELASIS.

*Lateral sepals distinctly strongly keeled or winged.*

No. 2, *T. pygmaea*.

\* \* *Lateral sepals not strongly keeled or winged.*

No Burmese species.

#### Section II. OXYANTHERA, Brongn. (Gen.).

No Burmese species.

Doubtful species.

No. 1, *T. carinata*.

### APPENDICULA, Blume.

Small caulescent epiphytes, with hard woody stems a few inches long, and remarkably flat bifarious leaves, the sheathing bases of which overlap each other alternately on the stem. Flowers minute, either in elongated spikes or crowded in small heads at the end of the stem. Pollen-masses 8, and have this peculiarity, that they have no caudicle in the sense in which Lindley uses the word, no stipes in Bentham's sense, but they taper gradually after the manner of *Calanthe* and *Limatodis*, and are attached by their slender ends (which Bentham calls caudicles) to the gland, which I find is round, or ovate and pointed. A

similar remark to that made on the last genus may be made also on this, *Parish*.

1. **A. bifaria**, Lindl. in Hook. Kew. Journ. vii. (1855), 35.

Leaves 1—1 by  $\frac{1}{2}$  in. oblong obtusely 2-toothed, racemes chiefly terminal very short, mentum saccate rounded, lip ovate-oblong base calceolar, sides of column produced into ensiform processes as long as the rostellum.

Tenasserim ; *Helper*.

*Stem*, 10—24 in., simple. *Leaves* often apiculate between the obtuse apical teeth. *Racemes* terminal, rarely lateral or leaf-opposed, 6—8-fld., bracts reflexed, oblong ; flowers about  $\frac{1}{6}$  in. long ; sepals obtuse ; petals obovate-oblong, 3-nerved ; lip calceolar at the base ; that is having a horse-shoe membrane within the border, slightly constricted beyond the middle, callus on its disk globose or oblong, entire ; arms of column obliquely truncate or 2-lobed. *Capsule*  $\frac{1}{4}$  in. long, turgidly ellipsoid. *Hook. f. Fl. Brit. Ind. vi. 82.*

Benth. Fl. Hongkong, 358 ; Walp. Rep. vi. 893.

SYN.—*A. reduplicata*, Rchb. f. in Ot. Bot. Hamb. 45 (? 145) ; C. P. 365.

2. **A. callosa**, Blume, Bijdr. 303.

Leaves  $\frac{1}{2}$ —1 by  $\frac{1}{6}$  in. oblong strongly 2-fid, sheaths 2-cuspidate, flowers in terminal bracteate heads, lip very shortly ovate with a large transverse basal appendage.

Tenasserim ; *Griffith, Parish*.

*Stem* 6—18 in. simple. *Leaves* close together, coriaceous, base truncate, tip not contracted. *Heads of flowers* sessile ; bracts lanceolate scarious, obtuse, many-nerved ; flowers  $\frac{1}{6}$  in. long, erect, cream-coloured ; mentum saccate ; petals linear, obtuse ; claw of lip as long as the foot of the column and adnate to it throughout its length ; limb broadly ovate, narrower than the appendage, which has divergent lobes, and is tubercled in the sinus ; column with short truncate wings. The leaves are often curiously pitted. *Hook. f. Fl. Brit. Ind. vi. 83.*

Lindl. Gen. and Sp. . 30 ; Griff. in Calc. Journ. Nat. Hist. v. 362, t. 62 ; Saund. Ref. Bot. t. 45 ; Rchb. f. Otia. Bot. Hamb. 45 ; C. P. 355.

SYN.—*A stipulata*, Griff. Notul. iii. 358 ; Ic. Plant. Asiat. t. 335. f. 2.

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### KEY TO SPECIES.

#### APPENDICULA,\* Blume.

*Stem* tufted, leafy, often compressed. *Leaves* numerous, distichous uniform, vertical, jointed on their sheaths. *Peduncles* terminal and leaf-opposed ; flowers minute, racemed spicate or capitate ; bracts persistent. *Sepals* connivent, lateral connate at the base and adnate to the produced foot of the column, forming a mentum. *Petals* various. *Lip* erect, inserted on the foot of the column or with its sides adnate to it. *Column* very short, rostellum erect 2-fid ; anther dorsal, erect ; pollinia 8, 4 often imperfect, clavate, attached in fours to the tip of the rostellum by a point or gland. *Capsule* very small.

\* Lip adnate below by a broad saccate claw to the sides and face of the foot of the column.

† *Limb of lip with a large callus on the disk.*

No. 1, *A. bifuria*.

† † *Lip without a median callus on the disk.*

No. 2, *A. callosa*.

\* \* Lip attached by a short free claw to the apex only of the foot of the column.

No Burmese species.

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### PODOCHILUS. Bl.

Another genus of inconspicuous orchids. Stems caulescent, a few

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\* See Appendix A, Genus 73.

inches long, leaves close-set and bifarious. Flowers most minute, sometimes no bigger than a large pin's head, solitary or spiked, generally terminal. The pollen-masses are 4, attached in pairs, by 2 stipites (caudicles of Lindley), to a common gland, which is ovate and pointed. This is true of *P. cultratus*. But in *P. lucescens* I find 2 stipites with 4 pollen-masses seated on their *united connivent summit* but *no gland*, and the stipites are divergent at the base. Altogether the structure of the *Pollenarium* in this genus is remarkable to a degree, and can only be shown properly by elaborate and highly magnified drawings.

The flowers of this and the two preceding genera have spurred or pouched bases, and are closed instead of spreading. *Parish*.

1. *P. cultratus*, Lindl. Wall. Cat. 7336; Gen. and Sp. 234; in Journ. Linn. Soc. iii. 37.

Leaves ensiform subfalcate acute, lip cuneately oblong truncate 5-nerved, base saccate.

Tenasserim; the Attaran River, *Parish*.

*Stem* 3—7 in., with the leaves  $\frac{1}{3}$ — $\frac{2}{3}$  in., broad. *Leaves*  $\frac{1}{3}$ — $\frac{2}{3}$  in. many-nerved. *Peduncle* short, decurved; bracts ovate-lanceolate; flowers  $\frac{1}{8}$  in. long; dorsal sepal broad, 5-nerved, lateral subacute; petals broadly obovate, acute, 3-nerved; mentum saccate; base of lip broad. *Capsule*  $\frac{1}{4}$  in. The lip resembles that of an *Appendicula*; I doubt its being articulate and mobile. *Hook. f.* Fl. Brit. Ind. vi. 80. C. P. 222.

2. *P. lucescens*, Blume, Bijdr. 295. t. 12 Rumphia iv. 43 (in Obs.).

*Stem* slender erect, leaves  $\frac{1}{3}$ — $\frac{1}{2}$  in. elliptic- or linear-oblong obtuse or apiculate, spikes elongate many-fl., bracts spreading and incurved, lip obovate or oblong obtuse, base sagittate.

Tenasserim; at Mergui, *Helfer*, *Parish*.

*Stems* 4—8 in. rigid. *Leaves* black when dry, opaque, many-nerved. *Spike*  $\frac{1}{4}$ —1 in., flexuous, flowering to the base; bracts  $\frac{1}{8}$  in., strongly nerved; flowers  $\frac{1}{10}$  in. diam. *Hook. f.* Fl. Brit. Ind. vi. 82.

Lindl. in Gen. and Sp. 234 ; Rchb. f. in Bonpland. v. (1857), 41 ; Otia. Bot. Hamb. 45 ; in Trans. Linn. Soc. xxx. 145 ; C. P. 159.

**3. *P. microphyllus***, Lindl. in Wall. Cat. 7335A ; Gen. and Sp. 234 in part.

Stems filiform diffuse, leaves  $\frac{1}{6}$ — $\frac{1}{4}$  in. elliptic-lanceolate awned, spike as long as the leaves capillary flexuous 3—4-fld., bracts most minute, lip ovate oblong or lanceolate 3-nerved, basal appendage quadrate.

Tenasserim ; at Mergui, *Parish*.

Stems 6—8 in., flexuous, rarely branched. *Leaves* articulate on the sheaths, 7—9-nerved. *Flowers*  $\frac{1}{10}$  in. long, white and purplish ; mentum very variable, saccate, sometimes constricted at the top and 2-lobed at the base ; dorsal sepal ovate, 1-nerved ; lateral subacute ; petals oblong, obtuse, 1-nerved ; lip variable, obtuse or subacute ; basal appendage erect,  $\frac{1}{4}$ — $\frac{1}{3}$  the length of the blade, concave or margins convolute ; rostellum narrow ; anther lanceolate, acute. *Capsule*  $\frac{1}{8}$  in., ellipsoid. Scortechini MSS. describes hyaline wings of the column, which I have not detected. *Hook. f.* Fl. Brit. Ind. vi. 81.

C. P. 247.

## KEY TO SPECIES.

### PODOCHILUS,\* Blume.

*Stems* tufted, erect or diffuse. *Leaves* many, uniform, distichous, flat or equitant and laterally compressed. *Peduncles* terminal or leaf-opposed ; flowers minute, racemed or spicate ; bracts persistent. *Lateral sepals* adnate to the prolonged foot of the column and together at the base, forming a mentum. *Petals* broad or narrow. *Lip* clawed, jointed to the foot of the column, mobile (always ?) erect, with a basal appendage. *Column* very short ; rostellum terminal, triangular, erect, bifid or

\* See Appendix A, Genus 72.

hipartite ; anther erect ; pollinia 4, each pair half enclosed in a calyptri-form stipe fixed by a gland to the top of the rostellum. *Capsule* very small, ellipsoid.

The flowers of all the species want careful examination in a living state. There are great differences in the columnar structure and pollinia that cannot be satisfactorily determined from dried specimens. These last are almost in all cases deficient in flowers, which are easily detached, and so minute as to escape the notice of collectors.

\* Leaves equitant, laterally compressed, not articulate with the sheath. *Flowers* secund, on inclined or decurved lax-fld. racemes.

No. 1, *P. cultratus*.

\* \* Leaves flat, not equitant or laterally compressed.

† *Leaves broad. Scapes lateral.*

No Burmese species.

† † *Leaves very small, linear acicular or lanceolate, Scape terminal or nearly so.*

No. 2, *P. lucescens* ; No. 3, *P. microphyllus*.

### CORYMBIS,\* Thouars.

Tall, terrestrial, rigid, leafy herbs, roots fibrous. *Leaves* broad, plaited. *Flowers* in short axillary stiff sessile spreading panicles. *Sepals* and *petals* very narrow, linear, at first cohering in a tube with spreading tips, persistent. *Lip* erect from the base of the column, linear, channelled, tip dilated and recurved. *Column* usually as long as the petals, erect, terete, tip clavate and 2-lobed or -auricled ; rostellum at length 2-fid ; stigma erect, transverse saccate ; anther narrow, erect, acuminate, 2-celled ; pollinia clavate, attached by a subulate caudicle to a peltate gland. *Capsule* linear or fusiform. Hook. f.



1. *O. veratrifolia*, Blume Orchid. Archip. Ind. 135, t. 42E 42f. 1. (*Corymborchis*).

Leaves elliptic-lanceolate caudate-acuminate, flowers 1—1¼ in. long, sepals and petals subsimilar narrowly oblanceolate, blade of lip lanceolate acuminate, ribs of capsule smooth.

Andaman Islands, *King's Collector*.

Stem 4 ft. high, as thick as a swan's quill. Leaves 12—18 in., sessile on the sheaths, nerves very many and strong. Panicles 4—6 in. long and broad; bracts ⅓—½ in., ovate-lanceolate; flowers greenish-white; column long. Capsule in Ic. Blume, 2 in. long. The ripe fruit of the Andaman species is 1 in. long. Hook. f. Fl. Brit. Ind. vi. 91.

SYN.—*C. disticha*, Lindl. Fol. Orchid. 1 (i. part).

*Macrostylis disticha*, Breda Gen. and Sp. Orchid. Javan. t. 2.

*Hysteria veratrifolia*, Reinw. in Bot. Zeit. 1825, ii. 5; Lindl. Gen. and Sp. 439.

*Rhyncanthera paniculata*, Blume Bijdr. t. 78.

*Corymborchis assamica*, Blume Orchid. Archip. Ind. 126, t. 43, f. 2A.

I am not sure that this genus is correctly placed. *B. G.*

## B. ANTHER ONE ONLY.

### II. Pollen-masses powdery, granular or sectile.

#### Tribe IV. OPHRYDEÆ.

Anther terminal, erect.

#### **ACCORAS**, R. Br.

Terrestrial herbaceous plants with short leafy stems and fleshy fascicled roots with one swollen tuber. The flowers are small and of a dull colour, in terminal spikes. Anther erect, 2-celled. Pollen-masses 2, with separate caudicles, but only one common pouch.

The orchids of this and the following genera, included in the tribe Ophrydeæ, are all terrestrial, and resemble in appearance the orchids of our home woods and pastures. The structure of the anther and pollen-masses differs much from any hitherto described. The former is no longer an easily detached lid or cap, but a firm and fixed part of the column, with two very distinct cells opening vertically by long slits or sutures. The pollen-masses again, instead of being hard and waxy, consist of a number of small grains which cohere by means of an elastic cobwebby substance, and taper into a point below, and end in a gland. This extended or tapering portion is the true "caudicle," so called by Bentham and by Lindley also, and it is a part of the pollen-mass itself. It differs entirely from the so-called caudicle of Vandææ, which is no part of the pollen-mass, and to which Bentham prefers to give the name of "stipes." The Ophrydeæ are mostly orchids of temperate or subtropical regions; evidently, however, not confined to them, as our ever widening knowledge of this order serves to prove. *Accras anthropophora* is common in our English woods. Our solitary Burmese species, *Accras angustifolia* was first (I believe) found in Simla and elsewhere in Northern India. Wight, who figures it among his *Icones*, says, "This genus has not yet been found so far south," meaning, I suppose, Madras. We have now brought it nearly as far south. It is a mean plant, but interesting in this fact, that it is so far separated from its congeners. *Parish.*

The distinctions between the remaining genera of this tribe turn on minute and purely technical points. I must refer the student to Hooker's *Flora of British India* for a far more satisfactory classification of these nearly allied genera. *Peristylus* is made a section of *Habenaria* and *Platanthera* is absorbed in the same genus; *Accras* is grouped with *Herminium* under the latter name. Hooker arrives at the conclusion that *Herminium* should be added to *Habenaria* "were it not for the consequent disturbance of much nomenclature, and the multiplication of synonyms," as also should *Diplomeris* and *Hempilia*.

The above have been given as separate genera in this work for the sake of the form generally adopted, but only those species specially given by Parish in his list of Burmese orchids in Mason's *Burma* under these

generic names have been so placed ; for the remainder Hooker's nomenclature being adopted.

Parish notes, " all these terrestrial orchids must be sought for in the rains, when only they flower. They die down at the approach of the dry season, when they are kept alive, as our European species are in the winter, by their underground bulbous root." *B.G.*

1. ***Accras angustifolia***, Lindl. in Wall. Cat. 7061 Gen. and Sp. 232 ; Bot. Reg. sub t. 1525 ; in Journ. Linn. Soc. iii. 43. .

Tall, leaves elongate linear, spike very long slender many-fl'd., bracts equalling the ovary or shorter, flowers decurved, petals linear very narrow 1-nerved, lip linear equalling the sepals in length or longer narrow trifid beyond the middle, side lobes filiform, midlobe very short.

Tenasserim, *Parish*.

Stout or slender, 1—3 ft. high, 1 or several leaved. *Leaves* scattered, 2—8 in., acute, rarely  $\frac{1}{2}$  in. broad. *Spike* 2—10 in.; flowers often very many, subsecund ; perianth connivent,  $\frac{1}{10}$ — $\frac{1}{8}$  in. diam. green ; sepals oblong, obtuse ; petals membranous, acute ; lip from as long to twice as long as the sepals or more, base not concave, lateral lobes very slender. Anther-cells parallel, pollinia clavate, gland large, staminodes large, spreading ; stigmatic lobes obscure or O ; rostellum minute, 2-lobed. *Capsule*  $\frac{1}{4}$  in., erect, oblong, turgid. Has in Sikkim an extraordinary range in altitude. *Hook. f.*

Royle Ill. t. 87 ; Wight Ic. t. 1691 ; C. P. 250.

SYN.—*Herminium angustifolium*, Fl. Brit. Ind. vi. 129.

*H. longicruris*, Wight in Mem. Acad. Philad. Ser. 2, vi. 411.

*Thisbe*, Falc. in Lindl. Veg. Kingd. 183, c. (name only).

## KEY TO SPECIES

HERMINIUM,\* Linn. (includes *Accras*).

Terrestrial small erect tuberous herbs ; tubers oblong, undivided. *Leaves* solitary or few. *Flowers* small spicate. *Sepals* subequal, 1-nerved

See Appendix A, Genus 105.

free or conniving in a hood, the lateral spreading. *Petals* smaller or nearly as large, often thick fleshy. *Lip* continuous with the base of the column, shorter or longer than the sepals, broad or narrow, spreading or pendulous, entire or 2—3-fid, base flat concave or very shortly saccate. *Column* very short; stigma 2-lobed or with 2 globose or clavate processes; rostellum short; anther adnate to the face of the column, cells parallel or slightly diverging below; pollinia 2, caudicles very short, glands naked, small or large, or with each gland and its caudicle sheathed by a conical naked coriaceous extingisher-like shiny brown appendage.

There is no character by which *Herminium* can be distinguished from *Habenaria*, except that the lip has never a spur, only a gibbous sac. The glands of the pollinia vary extraordinarily in the several species, from small and orbicular to extingisher-like bodies, truncate, hollow, coriaceous, brown, shining, and sometimes split down one side. The caudicle appears to be inserted at the bottom of this organ, which is a development of the gland itself; it is exposed at the base of the anther-cell, and like the ordinary gland, is removable with the pollinium. The Indian *Hermnia* are all mountain or alpine, and attain the greatest elevation of any orchids. Hook. f.

\* *Lip* 3-lobed.

*H. angustifolium* see *Accras, angustifolia*.

\* \* *Lip* entire. *Bracts* short in all but *H. gramineum*.

No Burmese species.

## GYMNADENIA, R. Browne.

1. **G. Helferi**, Rchb. f. in *Flora*, 1872, 276; in *Trans. Linn. Soc.* xxx. 139.

Stem pubescent, leaves and bracts linear or oblong-lanceolate acuminate, flowers 1—1½ in. diam., lip very large orbicular cuculate, spur infundibular acute.

Tenasserim; at Moulmein, *Lobb, Helfer, Parish*.

*Stem* 12—18 in., rather stout; tubers oblong. *Leaves* 4—8 in.,

sessile, acuminate, base narrowed. *Flowers* shortly pedicelled; sepals falcately-lanceolate, acuminate, nearly 1 in. long, green, lateral at length recurved; petals ovate-lanceolate, acuminate, green; lip twice as large as the sepals, very concave with recurved edges, folded down the centre, purple; anther obtusely apiculate, cells narrow parallel, tubes very short, pollinia clavate, as long as their broadly winged caudicles, glands approximate, rather large; stigmatic processes obscure; rostellum small fleshy, 3-lobed, erect between the glands. *Capsule*  $\frac{2}{3}$  in., linear-oblong, sessile, erect, ribs thick. Reichenbach describes the lip as "broad or narrow. *Hook. f.*

A species equally, or even more, abundant than *G. sesamoides*, distinguished by a narrower lip and its varying colour, which is green, or lilac, or deep purple. *Parish.*

Otia Bot. Hamb. Fasc. i. 1878, p. 39; C. P. 1.

SYN.—*Habenaria Helferi.*, Hook. f. Fl. Brit. Ind. vi. 164.

## 2. *G. sesamoides*.

A common terrestrial orchid about Moulmein and Martaban. It is about 1 ft. high, and has a leafy stem, the leaves of which are little more than scales below, growing larger upwards. The flowers are solitary in the axils of the leaves and of large size, 1 in. long. These sepals and petals are convenient, *i.e.* adhere together, on the upper side of the flower, pointed with upturned ends. The lip is very large, spur white, very broad when expanded, but in its undisturbed state convolute, undivided, and furnished with a spur behind. The roots are fleshy with one round bulb. *Parish.*

This species is not named in the Fl. of Brit. Ind. *B. G.*

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## PLATANThERA, Rich.

*P. robusta*, see *P. Susannæ*.

### 1. *P. Susannæ*, Lindl. Gen. and Sp. 295.

A very handsome, and apparently a very rare, terrestrial orchid.

Stem 1 ft. or more high, leafy, terminated by 4—5 pure white flowers of a very large size, with an unusually long spur. The flowers of the plant found by me (I never found but one) were 3 in. across, and the spur 4 in. long only, but Wight, who figures it in his *Icones* (for it is found also in the Pulney Hills) represents it as  $4\frac{1}{2}$  in. across with a spur "twice its length." He calls it a magnificent species, and adds, "I have never met with it except once." The sepals are very large and broad, the petals very narrow and acute. The lip is 3-parted, the middle lobe being straight and linear, the side lobes broad and lacinated, or deeply jagged. The plant is also a native of Java, China, and Nepal, and has long been known to botanists, having been called *Orchis Susannæ* by Linnæus himself. *Parish.*

Wight  *Ic. t.* 920; Dalz. and Gibbs. *Bomb. Fl.* 269; C. P. 122.

SVN.—*Habenaria Susannæ*, Hook. f. in *Fl. Brit. Ind.* vi. 137; Br. *Prodr.* 312; Blume *Bijdr.* 402.

*H. gigantea*, Don *Prodr.* 24; Bot. *Mag. t.* 3374; Grah. *Cat. Bomb. Pl.* 201.

*Platanthera gigantea*, Lindl. in *Wall. Cat.* 7052.

*P. robusta*, Lindl. in *Wall. Cat.* 7036; *Gen. and Sp.* 295 (? 296), "in regno Burmano, Prome;" C. P. 370.

*Orchis Susannæ*, Linn. *Sp. Pl. No.* 939.

*O. gigantea*, Sm. *Exot. Bot. t.* 100.

*O. altissima*, Herb. Ham.

Parish gives *Susannæ* and *robusta* as separate species, and figures both. *B. G.*

### HEMIPILIA,\* Lindl.

Terrestrial 1-leaved tuberous herbs. *Leaf* radical, broad. *Flowers* laxly racemose. *Sepals* equal in length, lateral spreading. *Petals* broadly

\* See Appendix A, Genus 108.

ovate, entire. *Lip* continuous with the column, broad, obscurely 3-lobed, spreading; spur trumpet-shaped. *Column* very short; rostellum broad, projecting from between the anther cells, complicate; stigmatic processes 0; anther cells subdivergent, tips produced into grooves of the rostellum; pollinia 2, caudicles long, glands distant exposed. *Hook. f.*

1. ***H. calophylla***, Par. and Rchb. f. in Journ. Bot. xii. (1874) 197.

A small terrestrial orchid with a single broad ovate pointed leaf which is most beautifully marbled. Root, a single ovate bulb, with several fleshy rootlets above it. Stem solitary 6—8 in. high. Flowers 5—6, about an inch apart, and an inch long, supported on pedicels (the germ) of the same length, each subtended by a small bract. The upper sepal and the two petals are erect and connivent, being arched over the column and anther, forming a sort of hood to them, as in some *Habenarias*. The lateral sepals are expanded and reflexed. They vary in colour from white to pink. The lip, which is  $\frac{3}{4}$  in. long and deep violet, is broad, ovate, slightly truncate, wavy at the margin, and produced into a spur behind. A very beautiful little plant. It is found on the limestone rocks which abound in the Tenasserim Provinces. *Parish.*

Par. and Rchb. f. in Otia Bot. Hamb. 1878, p. 38; Bot. Mag. t. 6920; Hook. f. in Fl. Brit. Ind. vi. 167; C. P. 348.

### ***Peristylus*, Blume.**

1. ***P. constrictus***.

A tall stout terrestrial orchid, often 2 ft. or more high, with large broad stem-clasping leaves and a dense spike of numerous pure white flowers, intermingled with long lanceolate bracts. The lip is trifid, and has a small round almost detached scrotiform pouch at its base. Common in the rains in the neighbourhood of Moulmein. Roots fleshy and fibrous, with a large bulb. *Parish.*

Lindl. Gen. and Sp. 300 ; C. P. 181.

SYN.—*Platanthera constricta*, Lindl. in Wall. Cat. 7043.

*Herminium constrictum*, Lindl. in Bot. Reg. under t. 1449.

*Orchis leucantha*, Herb. Ham.

*Habenaria constricta*, Hook. f. in Fl. Brit. Ind. vi. 161.

## 2. *P. goodyeroides*, Lindl. Gen. and Sp. 299.

Stem 1—2 ft., stout, leaves elliptic-oblong or-lanceolate acute, spike elongate dense-fl'd., flowers subsecund, bracts equalling or exceeding the ovary, lateral sepals  $\frac{1}{4}$  in. linear- or ovate-oblong obtuse, petals gibbously ovate, lip as long as the sepals trifid, spur minute.

Tenasserim and Andaman Islands. *Hook. f.*

Stem 1—2 ft., stout. Leaves 6—10 by 2—3 ft. (? in.), base contracted, hardly petioled. Spike 4—12 in.; bracts lanceolate, membranous; flowers about  $\frac{1}{3}$  in. diam., very variable in size, yellowish green; sepals  $\frac{1}{6}$ — $\frac{1}{6}$  in.; lip recurved, sessile, lobes very variable, spur subglobose fusiform or clavate; anther small, tubes very short, pollinia clavate, caudicles hardly any; glands small; stigmatic processes short, clavate; rostellum erect, toothed. Capsule  $\frac{1}{2}$  in., sessile, fusiform, acute. *Hook. f.*

Dalz. and Gibs. Bomb. Fl. 270; Royle Ill. t. 87, f. 2; C. P. 169.

SYN.—*Habenaria goodyeroides*, Don. Prodr.; Hook. f. in Fl. Brit. Ind. vi. 161.

*Peristylus grandis*, Blume Bijdr. 405.

*Herminium goodyeroides*, Lindl. in Wall. Cat. 7066.

## 3. *P. Parishii*, Rchb. f. in Trans. Linn. Soc. xxx. 139.

Stem short stout, leaves sessile ovate-oblong, spike narrow elongate, bracts linear-lanceolate longer than the small flowers, both erect, lateral sepals linear-oblong obtuse, petals broader ovate-oblong, lip as long as the sepals shortly 3-lobed beyond the middle, spur very short fusiform.

Tenasserim; at Moulmein. *Parish.*

Stem below the leaves very stout, 3—4 in., laxly sheathed, above the stem 3—6 in., with 2—3 lanceolate sheaths. Leaves 3—5 by



1½—2 in., acute or acuminate. *Spike* 4—6 in.; bracts ½—¾ in. with filiform tips and flowers appressed to the rachis; ovary ⅓ in.; sepals ⅙ in.; petals ovate-cordate, obtuse; lip very variable in form, broad or narrow, lobes short obtuse, or the middle one narrower and longer. Turns black in drying. The specimens are not good. Perhaps a form of *goodyeroides*. *Hook f.*

C. P. 216.

SYN.—*Habenaria Parishii*, Hook f. in Fl. Brit. Ind. vi. 162.

### HABENARIA, Willd.

An extensive and widespread genus of terrestrial orchids. They are found in Europe, Asia and Africa. *H. bifolia* or "The butterfly orchis" as it is called, is sufficiently common in our English woods to be familiarly known to very young botanists. Their general aspect is very similar wherever found. They are commonly about a foot or 18 in. high, and have a leafy stem terminating in a spike of sessile white or yellow flowers, and a large bract under each. The sepals and petals are nearly equal, but the petals, if anything, the smallest. Lip almost always 3-lobed, often with its segments much elongated, or cut into fringes. The root is tuberous; sometimes one, sometimes two may be found, according as the last year's tuber has decayed sufficiently to fall off or not. There are 16 species enumerated in my list, and no doubt there remain many more to be discovered. *Parish.*

#### 1. *H. acuifera*, Wall. in Lindl. Gen. and Sp. 325.

Slender, leaves scattered linear-lanceolate acuminate, upper setaceous, spike short, bracts longer than the beaked ovary, sepals obtuse, dorsal broadly oblong shorter than the concave oblong lateral, petals much smaller linear-oblong, lip as long as the sepals, side lobes short subulate, midlobe linear, spur half as long as the ovary.

Tavoy. *Wallich.*

*Stem* 10—18 in., flexuous. *Leaves* 2—4 by ⅓—½ in., erect, base

sheathing, upper and linear lanceolate ciliolate bracts very finely acuminate ; ovary  $\frac{1}{2}$ — $\frac{2}{3}$  in., rugose, beaked for half its length; flowers golden,  $\frac{2}{3}$  in. diam.; dorsal sepal strongly 3-lateral 5-nerved; petals 1-nerved; margins of midlobe of lip revolute, spur slightly clavate ; anther large, apiculate, tubes long erect, caudicles of pollinia long very slender, gland minute ; stigmatic processes clavate, incurved. Lindley errs in describing the leaves as all radical, and in giving Ceylon as a habitat. *Hook. f. Fl. Brit. Ind. vi. 146—7.*

C. P. 229.

SYN.—*H. linguella*, Lindl. l. c. 325 (excl. hab. Ceylon).

*Platanthera acuiifera*, Lindl. in Wall. Cat. 7045.

*P. rostrata*, Lindl. in Wall. Cat. 7051 B.

## 2. *H. Andamanica*, Hook. f. Ic. Plant. ined.

Leaves crowded towards the middle of the stout stem, raceme lax-flid., bracts rather shorter than the ovary, upper segment of petals very slender, lower broader divided above the middle into 3 filiform laciniae, side lobes of lip palmately multifid, midlobe linear 3-fid, spur shorter than the ovary.

Andaman Islands. *Parish.*

*Stem* 12—18 in. *Leaves* 3—4 in., ovate-lanceolate, acute. *Raceme* 6—8 in. ; bracts lanceolate ; ovary  $1\frac{1}{4}$  in., very slender ; sepals  $\frac{1}{2}$  in. long ; laciniae of midlobe of lip filiform ; anther-cells parallel, tubes rather shorter than the cells ; gland of pollinia minute ; stigmatic processes subcylindric, elongate ; rostellum erect. *Hook. f. Fl. Brit. Ind. vi. 134.*

## 3. *H. avana*, Hook f.

Leaves linear-lanceolate acuminate, spike many-flid., bracts longer than the flowers, dorsal sepal very broad, lateral oblong acute, petals as long triangular, lip longer than the sepals tripartite from beyond the base, segments linear-subulate lateral incurved, spur as long as the short not beaked ovary.

Burma ; at Ava. *Mrs. Burney (Herb. Calcutt.).*

*Stem* 6—10 in. *Leaves*, lower 2 in., with long tubular sheaths,

upper many erect very narrow. *Spike* dense-fld. ; lower bracts  $\frac{3}{4}$  in. ; ovary  $\frac{1}{3}$  in., curved ; sepals rather shorter, dorsal broadly ovate obtuse 5-nerved ; lateral deflexed 3-nerved ; petals 2-nerved ; lip hardly twice as long as the sepals, linear before forking ; anther short, rather broad, tips of cells recurved hardly tubular ; caudicles of pollinia very short, gland large ; stigmatic processes long, clavate, adnate to the lip ; rostellum broad, acute, flat. *Hook. f.* Fl. Brit. Ind. vi. 148.

#### 4. *H. Brandisii*, Hook. f.

Very slender, leaves scattered towards the middle of the stem linear- or oblong-lanceolate acute, spike very long laxly many-fld., bracts nearly as long as the erect not beaked ovary, lateral sepals linear obtuse, petals broader ovate-oblong, lip clawed 3-partite, segments much longer than the sepals, lateral segments capillary, midlobe short, spur very short globose.

Pegu, *Brandis (Herb. Hort. Calcutt.)*.

*Stem* with spike 20 in. *Leaves* 3—5 in., membranous, upper smaller. *Spike* 8 in., very slender ; bracts  $\frac{1}{3}$  in., ovate-lanceolate ; flowers  $\frac{1}{6}$  in. diam., sepals and petals membranous, 1-nerved, lateral sepals deflexed ; long segments of lip 1 in. ; spur sub 2-lobed, with a very short contracted neck ; ovary small, with a thick dorsal ridge and terminal beak, cells parallel (tubes short upcurved ?) pollen grains few, large, glands not seen ; stigmatic processes clavate ; rostellum erect between the cells. *Hook. f.* Fl. Brit. Ind. vi. 162—3.

*H. chlorantha*, see *H. chlorina*.

#### 5. *H. chlorina*, Par. and Rehb. f. in Trans. Linn. Soc. xxx. 140 ; C. P. 218 and 245 (*H. chlorantha*).

Habit and character of *H. acutifera*, but rather stouter, leaves broader, spike longer, sepals and petals 3-nerved, side lobes of lip large and spur incurved below the middle with a large clavate ellipsoid tip.

Tenasserim ; Moulmein. *Parish, Lobb.* Shan States, alt. 4,400 ft. *Collett*,

*Leaves*  $\frac{1}{2}$ — $\frac{2}{3}$  in., broad. *Spike* 2—3 in. long, flowers at first yellow-green, then spotted with brown, at last brown. Probably a form of *H. acuífera* but besides the above differences the flowers are smaller. *Hook. f. Fl. Brit. Ind. vi. 147.*

6. *H. constricta*, Hook f., see *Peristylus constrictus*.

7. *H. commelinifolia*,\* Wall. in Lindl. Gen. and Sp. 325.

Tall, robust, leaves oblong to oblong-lanceolate, bracts longer than the long-beaked ovary slender, dorsal sepal orbicular much smaller than the gibbously hatchet-shaped beaked lateral, petals oblong, lip with a linear blade dividing into 3 very long filiform segments, spur very long.

Not given as Burmese by Hooker, but named in Parish's list. See note. *B. G.*

*Stem* 2—3 ft.; tubers ellipsoid (2—9 in. long, *Roxb.*). *Leaves* 3—6 in., upper or sheaths lanceolate. *Spike* 4—8 in., ovary 1—1½ in., upper  $\frac{2}{3}$ -rds filiform; flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. diam. white, inodorous mid-segment of lip deflexed, scaberulous, lateral widely spreading; spur 1½—2 in., incurved, green, mouth funnel-shaped; anther reflexed, tubes long straight erect; staminodes seated on the long arms of the column; stigmatic processes large, clavate, incurved; rostellum short, triangular. *Capsule*  $\frac{1}{2}$  in. sessile, fusiform, beak twice as long as the body. *Hook. f. Fl. Brit. Ind. vi. 143.*

Griff. Notul. iii. 372; Ic. Pl. As. t. 339; C. P. 227, "in regno Burmanico."

SYN.—*Platanthera commelinifolia*, Lindl. in Wall. Cat. 7037.

*Orchis commelinifolia*, *Roxb. Fl. Ind. iii. 451*; *Grah. Cat. Bomb. Pl. 201.*

*O. stylosanthes*, *Herb. Ham.*

8. *H. corymbosa*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 141. •

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\* Parish gives this name and the references to Lindl. Gen. and Sp. and to Wall. Cat. as above: possibly, however, the plant he refers to is *H. cubitalis*, Var. *brevifolia* (*Tavoy, Wallich*), to which plant Wallich gave the MSS. name of *com-melinifolia*. See *H. cubitalis*. *B. G.*

Very stout, leaves lanceolate, raceme dense-fld., bracts longer than the long-pedicelled beaked ovary. Sepals broad acute, petals bipartite, segments slender lower subulate half the length of the upper, lip 3-partite, segments subulate subequal or lateral smaller.

Tenasserim ; at Moulmein. *Parish.*

*Stem* 2—3 ft., leafy upwards, but naked below, and with only sheaths for the upper half. *Leaves* 3—6 in., base contracted. Raceme 3—4 in., very dense-fld. ; pedicels filiform ; bracts  $\frac{3}{4}$ —1 in., lanceolate ; flowers  $\frac{1}{4}$  in. diam. ; sepals 3-nerved ; lip not longer than the sepals, spur equalling the ovary, tip clavate ; anther cells divaricate below, tubes as long as the cells, pollinia narrow, glands minute ; stigmatic processes elongate, clavate ; rostellum triangular, acute. *Hook. f.* Fl. Brit. Ind. vi. 136.

C. P. 329.

#### 9. *H. cubitalis*, Br. Prodr. 312.

Tall, slender, leaves scattered or subradical, linear oblong or lanceolate acute, spike long narrow, flowers minute, bracts as long as the curved ovary or shorter, sepals linear-oblong concave keeled, petals larger ovate-oblong, lip not exceeding the sepals 3-fld, side lobes spreading and recurved, midlobe shorter broad obtuse, spur straight, as long as the sepals, nearly cylindric.

Tenasserim. *Parish.*

*Stem* with the slender spike 1—3 ft. *Leaves* 2—6 in., sessile, flat, nerves obscure. *Spike* 8—12 in.; bracts ovate lanceolate, acuminate, lower  $\frac{1}{2}$  in.; ovary  $\frac{1}{4}$  in., erect, tip decurved, sepals  $\frac{1}{2}$  in., obtuse, 1-nerved, nerve produced beneath the tip, dorsal longest and broadest ; petals obliquely oblong, obtuse ; lip with a short concave claw, lateral lobes shorter than or equalling the sepals ; anther minute, cells parallel, tubes O, pollinia short granular, caudicles and glands obscure ; stigmatic processes clavate ; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia. Near *H. stenostachya*, but flowers much smaller. There are two forms in Ceylon, one with leaves scattered along the stem, and another also found in Tenasserim with radical leaves ; the latter is Var. *brevifolia*. *Hook. f.* Fl. Brit. Ind. vi 157.

SYN.—*Platanthera cubitalis*, Lindl. Gen. and Sp. 292. Thwaites Enum. 310.

*Orchis cubitalis*, Linn. Fl. Zeyl. 320.

Var. *brevifolia*, leaves very short, 1—1½ in., radical linear oblong. Hook. f. l. c.

Tavoy, Wallich.

SYN.—*Cæloglossum brevifolium*, Lindl. Gen. and Sp. 302 (excl. hab. Nepal).

Wallich's specimens in Herb. Linn. Soc. are not numbered by him, but are ticketed "Tavoy, Dec. 16, 1827." The number 7041 which has been put on the sheet by another hand, Wallich gave only to the Khasian plant, his *linifolia* (*H. khasiana*). To Var. *brevifolia* he gave the MSS. name of *commelinifolia* (not *micrantha*, as Lindley states in his Herbarium). Hook. f. l. c.

Perhaps this is Parish's *H. commelinifolia*? B. G.

# 10. *H. digitata*, Lindl. Gen. and Sp. 307.

Leaves ovate or ovate-oblong, raceme laxly many-fl'd., lateral sepals ovate acute, dorsal suborbicular, petals bipartite, segments subequal or the upper broader, lip tripartite, segments linear, spur equalling the ovary.

Tenasserim, Parish.

*Stem* 1—2 ft., leafy. *Leaves* 2—5 in., very variable, acute or acuminate, rarely narrowed into a petiole, from orbicular to lanceolate. *Raceme* 3—5 in.; bracts large, lanceolate, often almost foliaceous and exceeding the flowers; pedicels very short; flowers ½—¾ in. broad, green; segments of petals variable in length, sinus between the segments narrow or rounded; midlobe of lip shorter or longer than the side lobes; spur subclavate, sometimes inflated, with an erect ligule at the mouth; anther-cells parallel, tubes short upcurved; glands of pollinia minute; stigmatic processes clavate; rostellum erect, triangular. *Capsule* shortly pedicelled, ½ in., fusiform, ribs thick. Hook. f. Fl. Brit. Ind. vi. 1314—5.

Dalz. and Gibs. Bomb. Fl. 267; Rchb. f. in Trans. Linn. Soc. xxx. p. 140, No. 10; C. P. 124.

SYN.—*H. trinervia*, Wight Ic. t. 1701. *Bonatea punduana*, Lindl. in Wall. Cat. 7063. *B. benghalensis*, Griff. in Calc. Journ. Nat. Hist. iv. 382. *B. herbacea*, Wall. MSS.

11. *H. ditricha*, Hook f.

Scapigerous, leaves linear acute not margined, spike few-fl., bracts as long as the ovary, sepals 1-nerved dorsal broadly ovate as long as the lanceolate acute lateral, petals as long ovate-lanceolate acute, lip much longer than the sepals 3-partite, side segments capillary, spur longer than the beaked curved ovary slender incurved.

Tenasserim; at Moulmein, *Lobb*.

*Leaves* 3—4 by  $\frac{1}{6}$ — $\frac{1}{3}$  in., acute or acuminate. *Scape* with few-fl. raceme 2—4 in.; sheaths few, membranous; bracts  $\frac{1}{4}$ — $\frac{1}{2}$  in. ovate-lanceolate; flowers few,  $\frac{1}{4}$  in. broad; ovary  $\frac{1}{4}$  in., sessile curved; dorsal sepal obtuse, obscurely 5-nerved; mid segment of lip shorter than the lateral; spur hardly thickened at the tip; anther-cells divaricate, tubes short; caudicles of pollinia short stout, gland rather large; stigmatic processes clavate, adnate to the mouth of the spur. *Hook f.* Fl. Brit. Ind. vi. 151.

12. *H. geniculata*, Don Prodr. 25.

Stem tall leafy with many slender sheaths above, lateral sepals acute, petals linear-oblong, lip suborbicular, side lobes cuneate or rounded fimbriate or crenate, spur longer than the beaked ovary geniculate.

Burma, *Wallich*.

*Stem* 1—2 ft., stout. *Leaves* 2—6 in., sessile, oblong-lanceolate. *Spike* 4—20-fl.; bracts as long as the ovary; flowers  $\frac{3}{4}$ —1 in. long, white; lateral sepals  $\frac{1}{2}$  in.; lip often  $\frac{3}{4}$  in. broad; spur subclavate below the knee; anther-cells broad, divaricate, tubes elongate, up-curved, glands of pollinia small; stigmatic processes clavate, incurved, marginating the mouth of the spur; rostellum low, broad. *Capsule* 1 in. shortly pedicelled, beaked, deeply grooved and thickly ribbed. *Hook f.* Fl. Brit. Ind. vi. 138-9.

Lindl. Gen. and Sp. 324, "in regno Burmanico"; C. P. 226.

SYN.—*Platanthera geniculata*, Lindl. in Wall. Cat. 7042. (? 7502).  
*Habenaria*, Griff. Notul. iii. 406 ; Itin. Notes 31, No. 494 ; Ic. Pl. As, t. 340.

13. *H. goodyeroides*, see *Peristylus goodyeroides*.

14. *H. Helferi*, see *Gymnadenia Helferi*.

15. *H. lacertifera*, Benth. Fl. Hongk. 362.

Stem or scape stout or slender with few or many erect sheaths, leaves usually radical ovate or oblong, spike elongate few- or many-fl., bracts narrow longer than the erect very small flowers, lateral sepals linear-oblong obtuse, lip equalling or longer than the sepals trifid tripartite or obtusely 3-toothed, lobes or segments short subequal or the lateral long, spur minute ovoid or globose.

Tenasserim ; Tavoy and Penang, *Wallich*.

*Stem* 6—10 in. ; sheaths  $\frac{1}{2}$ —1 in., lanceolate. *Leaves* few 1—2 in., spreading, acute or obtuse. *Spike* 3—10 in., slender, lax or dense-fl. ; lower bracts often  $\frac{2}{3}$  in. ; ovary  $\frac{1}{3}$ — $\frac{1}{2}$  in., slender, erect, not beaked ; sepals  $\frac{1}{8}$ — $\frac{1}{6}$  in., 1-nerved, dorsal ovate-oblong, obtuse ; petals variable, rather thick ; lip very variable in length, and in length of lobes or segments, limb with a short spur over the short broad claw ; anther minute, cells nearly parallel, tubes 0 ; pollinia ovoid, grains large, glands obscure ; stigmatic processes small ; rostellum a plicate membrane stretched across the base of the anther but not (?) concealing the glands. *Capsule*  $\frac{2}{3}$  in. sessile, oblong, obtuse. *Hook. f.* Fl. Brit. Ind. vi. 163.

SYN.—*Caloglossum lacertiferum and acuminatum*, Lindl. Gen. and Sp. 302.

*Peristylus chloranthus*, Lindl. in Kew Journ. Bot. vii (1855). 37.

*Gymnadenia ? tenuiflora*, Lindl. in Wall Cat. 7055.

*Chaeradoplectron spiranthes*, Schauer in Pl. Meyen. 436 t. 13. C.

16. *H. longibracteata*, Hook. f.

Stem stout leafy 2—3 ft., leaves 6 by  $\frac{2}{3}$ —1 in. linear-oblong acute margins thickened, bracts 2—3 in. narrowly linear-lanceolate finely



acuminate, lip 3-partite, segments linear lateral shorter, spur short obtuse.

Burma, on the banks of the Irrawaddy at Seendya, *Wallich*.

SYN.—*Platanthera longibracteata*, Lindl. in Wall. Cat. 7048; Gen. and Sp. 293.

Wallich's specimens are in very young bud only, and the description of the flowers taken from Lindley cannot be depended on. It is a noble species, and should be sought for in Burma. *Hook. f. Fl. Brit. Ind. vi. 166* (among imperfectly known species).

**17. *H. lucida***, Wall. in Lindl. Gen. and Sp. 314.

Leaves fascicled towards the base of the tall scape, sepals cymbiform, petals subpanduriform truncate.

Pegu; at Rangoon, *Wallich*. Tenasserim; at Maulmein, *Parish*.

*Leaves* 4—8 by 2—2 ½ in., petioled, obovate or oblanceolate. *Scape* with the very lax-flid. raceme 12—20 in., bracts broadly ovate, half as long as the slender pedicelled beaked ovary, or longer, tips subulate; flowers ⅓ in. diam., greenish; lateral sepals reflexed, obtuse; petals smaller and narrower, contracted below the truncate end; lip subequally tripartite, midlobe narrow 3-nerved thick, rather longer than the sepals, lateral as long spreading and incurved; spur slender, curved, nearly as long as the ovary or longer, mouth with a short ligule; anther-cells short, erect, approximate, tubes short upcurved; pollinia pyriform, gland long narrow; stigmatic processes short, clavate; rostellum minute. *Hook. f. Fl. Brit. Ind. vi. 133*.

C. P. 224.

SYN.—*Platanthera lucida*, Lindl. in Wall. Cat. 7047.

**18. *H. Mandersii***, Hemsl. and Collett in Journ. Linn. Soc. ined.

Tall, lower leaves linear-oblong upper narrow lanceolate, raceme glabrous, bracts as long as the slender pedicelled long-beaked ovaries, dorsal sepal ovate obtuse as long as the oblong obtuse lateral, petals as long as the sepals linear-oblong obtuse, lip as long as the sepals entire or tripartite nearly to the base, lateral segments O or shorter than the

linear midlobe and recurved, spur twice as long as the ovary geniculate, tip clavate.

Burma ; at Mandalay, *Anderson (in Herb. Calcutt.), Collett.*

*Stem* with raceme 18 in. *Leaves* (imperfect) 3 in., upper narrow ones erect, 1—1½ in. *Raceme* 4 in.; bracts 1 in., ciliolate, lanceolate; ovary narrowly winged; sepals ½ in., 3-nerved, lateral subfalcate; petals usually straight, 3-nerved; margins of midlobe of lip revolute spur 1—2 in., mouth with a large obtuse ligule with revolute sides, the convex face (towards the mouth) has 2 short conical spurs side by side and a median tooth above them; anther very large, tubes long erect; pollinia much shorter than their long narrowly winged caudicle; glands ovate; stigmatic processes clavate. The organ at the mouth of the spur is very curious. *Hook. f. Fl. Brit. Ind. vi. 146.*

**19. *H. marginata*, Coleb. in Hook. Fl. Exot. t. 136.**

Subscapigerous, leaves few subradical sessile oblong or linear-oblong margins yellow, spikes many-fl'd., bracts equalling the ovary, dorsal sepal broadly ovate as long as the oblong-lanceolate lateral, petals ovate falcate, lip longer than the sepals tripartite side segments slender longer than the linear obtuse central, spur stout equalling the curved ovary or shorter inflated below.

Burma, *Wallich.*

*Leaves* ½—5 in. *Scape* 4—10 in.; sheaths many, erect, lanceolate broad or narrow. *Spike* 2—6 in., cylindric; bracts ciliolate; flowers ½ in. diam., yellow-green; lateral sepals 3—5-nerved, deflexed; petals as long, 2-nerved; spur clavate or fusiform below the middle; anther. cells distant, tubes short spreading funnel-shaped; caudicles of pollinia short, glands large; stigmatic processes long, adnate to the lip; rostellum triangular, acute. *Capsule* ½ in., fusiform, turgid, curved, obscurely beaked. *Hook. f. Fl. Brit. Ind. vi. 150.*

Lindl. Gen. and Sp. 320, "in montibus Prome;" Dalz. and Gibs. Bomb. Fl. 268; Griff. Notul. iii. 371; Ic. Pl. As. t. 341; in Cal. Journ. Nat. Hist. iv. 382; C. P. 226.

SYN.—*H. Promensis*, Wall. Cat. 7033; Lindl. Gen. and Sp. 320.

*Platanthera marginata*, Lindl. in Wall. Cat. 7038.

*Orchis mysorensis* and *clavata*, Herb. Heyne.

**20. H. monophylla**, Collett and Hemsl. in Journ. Linn. Soc. ined.

Leaf solitary subradical, stem and many-fl'd. raceme scurfily pubescent, bracts as long as the ovary or shorter, sepals and petals subequal oblong obtuse glabrous, lip much larger than the sepals clawed cuneately obovate 3-lobed, lateral lobes broad erose, midlobe smaller ovate obtuse, spur as long as the lip incurved obtuse.

Upper Burma, *Collett*.

A foot high, rather slender. *Leaf* 2 in. oblong, obtuse, sheathing the base of the stem. *Stem* flexuous; sheaths 2—3,  $\frac{1}{2}$  in., and bracts lanceolate, acuminate. *Raceme* 2 in., rather dense-fl'd.; bracts  $\frac{1}{3}$  in., flowers about as broad as long, side lobes of lip as broad as long, diverging, disk puberulous, speckled; anther ovoid or globose, cells parallel, contiguous, tubes O, glands of pollinia contiguous orbicular. Described from a single indifferent specimen. *Hook. f.* Fl. Brit. Ind. vi. 143.

**21. H. Parishii**, see *Peristylus Parishii*.

**22. H. pelorioides**, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 139, t. 27, f. A.

Tall, robust, leaves ovate or oblong-lanceolate passing into copious sheaths, spike many-fl'd., bracts large equalling the ovary ciliolate, sepals subequal lanceolate acuminate, lip linear, spur O.

Tenasserim; Amherst by the seaside, *Parish*.

*Stem* a foot high. *Leaves* 2—3 in., largest subradical; upper sheaths slender, passing into the bracts the lower of which are  $1\frac{1}{2}$  in. long. *Spike* 2—3 in., many-fl'd.; sepals  $\frac{2}{3}$  in. long, membranous; petals as long as the sepals, lanceolate, 1-nerved; lip very narrow; anthers cells elongate, with very long erect tubes, stigmatic processes long. *Capsule*  $\frac{3}{4}$  in., sessile, fusiform, An anomalous plant, clearly a *Peloria*

form. I have seen but one indifferent specimen. *Hook. f.* Fl. Brit. Ind. vi. 166 (among imperfectly known species).

C. P. 327.

**23. *H. Prainii*, Hook. f.**

Stem slender naked above or with one or two sheaths, leaves few oblong or ovate oblong acute, spike many-fl'd., bracts as long as or longer than the ovary, lateral sepals linear-oblong obtuse, petals broadly ovate fleshy obtuse or apiculate, lip shorter than the sepals broad obtusely 3-lobed at the apex, spur a minute globose sac.

Upper Burma (*in Herb. Calcutt.*).

*Stem* 12—18 in., naked below, and above except for a few lanceolate sheaths. *Leaves*  $1\frac{1}{2}$ —2 in., obtuse or acute, sessile, nerves obscure. *Spike* 2—3 in., rather dense-fl'd.; bracts subulate-lanceolate, acuminate, not herbaceous, lower  $\frac{1}{3}$  in.; ovary  $\frac{1}{4}$ — $\frac{1}{3}$  in.; flowers nearly horizontal; sepals  $\frac{1}{8}$ — $\frac{1}{6}$  in. long, apiculate behind the tip, 1-nerved; lip with a broad concave claw; anther small short broad, cells parallel; stigmatic processes rather long; rostellum minute, 3-fl'd. *Hook f.* Fl. Brit. Ind. vi. 159—160.

**24. *H. Promensis*, see *H. marginata*.**

**25. *H. rostrata*, Wall. in Lindl. Gen. and Sp. 325.**

Leaves lanceolate acuminate, upper passing into many slender erect sheaths, spike many and lax-fl'd., dorsal sepal cymbiform much shorter than the broadly ovate falcate lateral, petals broadly oblong obtuse, lip much longer than the sepals, segments very long filiform, spur shorter than the very long beaked ovary, tip pyriform.

Pegu and Tenasserim, *Wallich*.

*Stem* 5—12 in. *Leaves* 4—6 by  $\frac{1}{2}$ — $\frac{3}{4}$  in. *Spike* 2—4 in.; bracts very slender, ciliolate, longer than the ovary; flowers yellow spotted with brown, about  $\frac{1}{3}$ — $\frac{1}{2}$  in. diam.; sepals coriaceous lateral dimidiate oblong, deflexed, 5-nerved, tips turned up; petals oblong, pubescent, falcate, shorter than the sepals; tubes of anther-cells elongate, caudicle of pollinia long, glands linear; stigmatic processes forming a ring round

the mouth of the ovary; rostellum very short, triangular, *Young fruit* with the beak as long as the body. *Hook. f. Fl. Brit. Ind. vi. 146.*

C. P. 228.

SYN.—*Platanthera rostrata*, Lindl. in Wall. Cat. 7051A.

**26. *H. spatulæfolia***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 140.

Leaves 2—3 subradical obovate-spathulate, scape slender 2-fl., sheath and bracts large broad cymbiform, dorsal sepal hemispheric as long as the hatchet-shaped lateral, petals linear-oblong falcate, lip tripartite to the base, segments filiform, side ones short, central very long incurved, spur longer than the ovary tip clavate.

Tenasserim; at Mergui, *Parish*.

*Leaves* 4—5 by 1—1½ in., not margined, subpetioled. *Scape* as long; sheath subsolitary; bracts much shorter than the filiform straight beaked pedicelled ovary, which is 1¼ in. long; sepals ½ in. long; tubes of anther cells very long, slender; stigmatic processes short. *Habit of Diplomeris. Hook. f. Fl. Brit. Ind. vi. 145.*

C. P. 217.

**27. *H. stenostachya***, Benth. Fl. Hongk. 362.

Leaves lanceolate acuminate, spike narrow lax- or dense-fl., flowers small, bracts equalling or exceeding the ovary, lateral sepals linear obtuse, petals larger than the sepals triangular-ovate or oblong fleshy, lip as long as the sepals 3-fl., side lobes subulate, midlobe usually shorter broader and obtuse, spur straight about as long as the ovary.

Tenasserim, *Hook. f.*

*Stem* with the spike 6—30 in., usually slender, with many small sheaths above the leaves. *Leaves* 1—4 in., sometimes all subradical, erect, bases sheathing, 5—7-nerved. *Spike* 3—5 in.; flowers small, erect, greenish-yellow or white, about ⅓ in. diam.; bracts ¼—⅓ in., broadly ovate-lanceolate, finely acuminate; ovary ¼ in.; sepals ⅓ in. long, subequal, concave, lateral suberect, at length spreading, nerve very thick, produced into a point under the apex of the sepal; lip with a large excavate base, very variable in the length of the lobes, lateral

spreading or recurved ; anther minute, cells parallel, tubes O ; pollinia short, grains large, caudicle and gland obscure ; stigmatic processes clavate ; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia. *Hook. f. Fl. Brit. Ind. vi. 156—7.*

C. P. 231.

SYN.—*H. peristyloides*, Wight Ic. t. 1702.

*Platanthera stenostachya*, Lindl. in Hook. Journ. Bot. vii. (1855) 37.

*Gymnadenia ? tenuis*, Lindl. in Wall. Cat. 7057.

*Cæloglossum densum*, Lindl. Gen. and Sp. 302.

*C. cernuum*, Rchb. f. in Bonpland. 1855, 250.

*C. peristyloides*, Rchb. f. l. c. 1856, 321.

28. **H. Susannæ**, see *Platanthera Susannæ*.

29. **H. tipulifera**, Par. and Rchb. f. in Trans. Linn. Soc. xxx.  
139.

Leaves 4—6 linear-lanceolate acuminate, bracts very slender equalling the slender ovaries, lateral sepals linear obtuse, petals broader ovate-oblong obtuse membranous, lateral segments of lip many times longer than the sepals capillary, mid one short subulate, spur clavate as long as the sepals.

Tenasserim ; at Moulmein, *Parish*.

*Stem* 1—2 ft., with appressed sheaths below the leaves, and 1—2 lanceolate ones above them. *Leaves* 5—8 by  $\frac{3}{4}$ —1 in., clustered about the middle of the stem, membranous, sessile. *Spike* 6—10 in. ; flowers erect, small, distant ; bracts  $\frac{1}{2}$ — $\frac{2}{3}$  in. ; ovaries as long, straight ; sepals  $\frac{1}{8}$  in. long, 1-nerved, dorsal ovate-oblong broad or narrow, lateral erect ; lip divided close to the narrow concave claw ; anther minute, cells parallel, tubes O, pollinia clavate, caudicles very short, glands oblong ; stigmatic processes margining the claw of the lip ; rostellum broad, plicate, concealing the bases of the anther-cells and glands. *Capsule*  $\frac{1}{2}$  in., very slender, straight, erect. *Hook. f. Fl. Brit. Ind. vi. 157.*

C. P. 232.

SYN.—? *Peristylus gracilis*, Blume, Bijdr. 406.

**30. *H. trichosantha*, Wall. Cat. 7028.**

Leaves ovate-oblong or lanceolate, spike lax-fl'd., bracts shorter than the long-decurved narrow ovary, lateral sepals ovate-oblong or lanceolate acuminate puberulous, petals linear falcate acuminate, lip longer than the sepals, side lobes capillaceo-multifid, spur longer than the ovary.

Burma ; at Taongdong, *Wallich* ; Moulmein, *Parish* ; Attaran, *Brandis (in Herb. Calcutt.)*.

*Stem* 8—18 in. *Leaves* few, 3—6 in., 5—7-nerved. *Raceme* 4—10-fl'd. ; ovary 1 in., sessile ; lateral sepals  $\frac{1}{2}$  in. deflexed ; petals dilated upwards, entire or serrulate, 1-nerved ; spur  $1\frac{1}{2}$  in. ; anther-cells short, with short free tubes, pollinia much shorter than their caudicles, glands small ; stigmatic processes short, globose ; rostellum an obscure plate between the anther-cells. *Capsule* 1 in. fusiform, shortly beaked, deeply channelled. *Hook. f. Fl. Brit. Ind. vi. 138.*

*Lindl. Gen. and Sp. 324, "in regno Burmano." C. P. 219.*

**31. *H. vidua*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 140, t. 27, f. 2 ; C. P. 223.**

Leaves subbasal elliptic-lanceolate acute, scape above and flowers puberulous, raceme lax-fl'd., bracts much shorter than the ovary, dorsal sepal orbicular pubescent rather smaller than the oblong subacute lateral, petals hatchet-shaped, lip tripartite, segments filiform subequal longer than the sepals, side ones recurved over the flower, midlobe deflexed, spur longer than the long-beaked ovary acute.

Tenasserim ; at Moulmein, *Parish*.

*Stem* short, stout, with 1—2 spreading sheaths above the leaves. *Leaves* 3—5 by  $\frac{1}{3}$ — $1\frac{1}{2}$  in. *Raceme* 4—6 in. ; bracts ovate, acuminate ; flowers  $\frac{1}{2}$  in. diam. green and white, sweet scented ; pedicel with ovary  $\frac{3}{4}$ —1 in., nearly straight ; lateral sepals reflexed, margins revolute ; spur thickened below ; tubes of anther-cells divaricate ; pollinia much shorter than their slender caudicles, glands small ; stigmatic processes short, clavate, adnate to the mouth of the spur ; rostellum short, broad. *Capsule*  $\frac{3}{4}$  in., shortly pedicelled, straight fusiform, beak short. *Hook. f. Fl. Brit. Ind. vi. 146.*

## KEY TO SPECIES.

## HABENARIA, \* Willd.

Terrestrial leafy herbs with undivided or lobed tubers, and fleshy radical fibres. *Leaves* not plaited, bases sheathing. *Flowers* spicate or racemed. *Sepals* subequal or the dorsal shortest, lateral ascending, spreading reflexed or deflexed. *Petals* smaller or larger, simple or cleft (sect. *Ate*). *Lip* continuous with the base of the column, entire 3-lobed or 3-partite, base spurred. *Anther* adnate to the very short column, cells parallel or divergent below, bases often produced into a long or short tube ; pollinia clavate or pyriform ; caudicle long, short, or 0, sometimes winged, glands exposed, rarely overlapped by the rostellum ; staminodes granular surfaces on the side of the anther, rarely elongate ; stigma a single or double viscid area on the column below the anther, or two globose or clavate processes ; rostellum usually small and erect between the cells of the anther, rarely wholly obsolete.

After devoting many months to the examination of the Indian species of *Habenaria*, I propose the following grouping of them into sections as tentative only. I accept Bentham's view, that the genera which he has brought under it (in Gen. Plant.) cannot be separated from one another by natural or artificial characters. To these *Herminium* should be added, were it not for the consequent disturbance of much nomenclature and the multiplication of synonyms ; and so should also be *Diplomeris* and *Hemipilia*, which, though they have recognizable differential characters, these are of less importance than those of the four last sections here adopted.

Of all the floral organs of the genus, that of the rostellum is the most difficult of analysis ; and in the minute flowered species especially, of definition also. In respect of its relation to the glands of the pollinia it is often in moistened herbarium specimens impossible to determine whether the rostellum nearly overlaps these, or holds them exposed between its folds, or forms pouches beneath them, or a flap over them. By means alone of careful drawings of the rostellum of all the species made from living plants, can its modifications of form be understood ; but I doubt whether even this will help much towards the classification of the species, for I think its value in this respect has been greatly overrated in both *Ophrydeæ* and *Vandeæ*.

The structure of the stigma has been compendiously described by Bentham in the Journal of the Linnæan Society (xviii. 356), and I agree with him in thinking that to found genera on the modifications or even in the presence or absence of processes, would lead to a violation of affinities.

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\* See Appendix A, Genus 106.



The characters which I have taken for the primary groups, marked **A** and **B**, of lateral sepals reflexed spreading or deflexed, and erect or ascending, are in most cases obvious; but in dried specimens of some species placed in Sect. V. it is difficult to say whether the lateral sepals are reflexed naturally or accidentally, or whether, though erect in early flowering, they afterwards spread. The root and its tubers require investigation throughout the genus.

The staminodes present great variety; in most species they are mere warts on the sides of the anther, but in several not otherwise allied they are linear or styliform processes, attached either to the anther or base of the column, as in *Diphylax* and *Dithrix*.

At the end of the genus I have placed four monotypic sections founded on plants differing remarkably in habit from any of their congeners; some of these will, I expect, eventually be regarded (and rightly) as monotypic genera but in my present imperfect knowledge of any but Indian species of this very large genus, I prefer keeping them as sections, awaiting their confirmation as genera under the authority of a monographer of the whole tribe of *Ophrideae*.

#### **A. Lateral sepals spreading deflexed or reflexed.**

In some small-fl. species of Sect. V. *Peristylus*, the lateral sepals appear to be spreading or deflexed during or after flowering, and might hence be placed in Sect. III.

#### Section I. ATE.

\* Petals truncate or 2-fl.

No. 17, *H. lucida*.

\* \* Petals 2-partite.

† Stem leafy upwards. Racemes many-fl.

§ *Sepals with filiform tips.*

No. 2, *H. Andamanica*.

§ § *Sepals without filiform tips.*

No. 8, *H. corymbosa*; No. 10, *H. digitata*.

†† Stem leafy at or near the base only.

No Burmese species.

#### Section II. PLATYGLOSSA.

\* Side lobes of the lip lacerate to the middle or inner margin, midlobe linear.

No. 28, *H. (Platanthera) Susannæ*; No. 30, *H. trichosantha*,

\* Side lobes of lip petaloid, outer margins entire, toothed, or fimbriate, midlobe narrow.

† *Lip deeply 3-lobed or partite, not or hardly longer than the lateral sepals.*

No. 12, *H. geniculata*.

†† *Lip deeply 3-lobed or partite, much longer than the lateral sepals.*

No. Burmese species.

\* \* \* Lip short, 3-lobed at the broad apex.

No. 20. *H. monophylla*.

### Section III. TRIMEROGLOSSA.

\* Tubes of anther-cells long.

† *Perianth membranous; lateral sepals with deeply looped or arched nerves.*

No. 7, *H. commelinifolia*; No. 26, *H. spatulifolia*.

†† *Lateral sepals curved or nearly straight, nerves straight or moderately arched.*

No. 1, *H. acuifera*; No. 5, *H. chlorina*; No. 18, *H. Mandersii*; No. 25, *H. rostrata*; No. 31, *H. vidua*.

\* \* Tubes of anther cells short.

† Stem leafy upwards.

§ *Bracts lanceolate. Flowers not or hardly secund.*

No. 3, *H. Avana*.

§§ *Bracts large cucullate. Flowers secund.*

No Burmese species.

†† Leaves more than three, clustered towards the middle or base of the stem.

No. 11, *H. ditricha*; No. 19, *H. marginata*.

††† Leaves 2, rarely 3, radical or opposite on the stem, sessile, broadly ovate-cordate or oblong.

No Burmese species.

### Section IV. HOLOGLOSSA.

\* Stigmatic processes large.

† *Stem leafy upwards.*

No Burmese species.

†† *Leaf solitary at or below the middle of the stem (rarely 2)*

*Flowers subsecund. Rootstock or root branching (I think in all).*

No Burmese species.

\* \* No stigmatic processes.

No Burmese species.

**B.** *Lateral sepals erect, or ascending parallel to the dorsal and petals, or forming a hood with these, rarely at length spreading or deflexed.*

#### Section V. PERISTYLUS.

\* Spur as long as the sepals, or longer, or shorter in *H. aristata*.

† *Leaves scattered along the stem or radical.*

No. 9, *H. cubitalis* ; No. 27, *H. stenostachya*.

†† *Leaves clustered round the middle of the stem (sometimes scattered in H. Gardneri). Slender species ; spike long, lax-fl'd.*

No. 29, *H. tipulifera*.

\* \* Spur much shorter than the sepals, globose or ellipsoid.

† *Stem leafy, leaves scattered or subimbricate.*

No. 23, *H. Prainii*.

†† *Leaves clustered about the middle of the stem.*

No. 4, *H. Brandisii* ; No. 6, *H. constricta* ; No. 13, *H. Goodyeroides* No. 21, *H. Parishii*.

††† *Leaves few radical, or solitary and cauline.*

No. 15, *H. lacertifera*.

#### Section VI. PHYLLOSTACHYA.

No. 14, *H. Helferi*. (*Gymnadenia*).

#### ABBERANT SPECIES (OR GENERA ?) OF GROUP B.

#### Section VII. PLECTOGLOSSA.

Non-Burman.

#### Section VIII. DIPHYLAX.

Non-Burman.

## Section IX. DIPYLA.

Non-Burman.

## Section X. DITHRIX.

Non-Burman.

## IMPERFECTLY KNOWN SPECIES.

No. 16, *H. longibracteata* ; No. 22, *H. pelorioides*.

## TRIBE V. ARETHUSEÆ.

Anther terminal, opercular. Lindley.

**GALEOLA**,\* Lour. (ERYTHORCHIS, Blume).

Leafless, rarely leafy, yellow or brown, climbing or erect herbs ; stem or branches terminating in loosely paniced often drooping racemes or panicles ; flowers rather large. *Sepals* subequal, concave, connivent or spreading. *Petals* as long, narrower or broader. *Lip* sessile at the base of and loosely embracing the column by its base, short, broad, concave ; lateral lobes short or 0 ; midlobe broad. *Column* short or long, incurved, top dilated membranous ; anther 2-celled ; pollinia hippocrepiform, powdery or subwaxy. *Capsule* usually 2—4-valved, without septa ; seeds winged or not. Hook. f.

1. *G. altissima*, Rchb. f. Xen. Orchid. ii. 77.

Quite glabrous, stem very slender, spikes very many-fl'd. ; sepals and petals linear-oblong, lip with a broad fleshy ridge and a 2-lobed woolly mass on the disk.

Not given as Burmese by Hooker, but named in Parish's list. *B. G.* *Root* of fleshy thick fibres. *Stem* 50—120 ft., excessively branched, flexuous, fleshy and hard, reddish, branches slender, internodes swollen ; spikes 6—10 in., pendulous ; flowers ½ in. long ; sepals obtuse, 5-nerved, and narrower 3-nerved petals with rounded tips ; lip cymbiform, tip rounded erosely waved, disk with a median broad fleshy puberulous

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See Appendix A, Genus 75.

disk reaching to the middle, beyond which is a 2-lobed woolly mass ; sides of lip thin, transversely barred with purple, with slender nerves and impressed hairs ; column rather long ; anther mitriform. *Capsule* linear, 3—10 in. long, acuminate, valves membranous. *Hook. f. Fl. Brit. Ind. vi. 89.*

C. P. 70 ?

SYN.—*Cyrtosia altissima*, Blume Bijdr. 396 ; Rumph. i. t. 70 ; Lindl. Gen. and Sp. 26.

*Erythorchis altissima*, Blume Rumph. i. 200 ; Lindl. l. c. 438, in part.

*Hæmatorchis altissima*, Blume l. c. iv. t. 200 B.

## 2. *G. hydra*, Rchb. f. Xen. Orchid. ii. 77.

A very remarkable orchid indeed, found once by me, and once only, in the year 1859, far away in the jungles near “ Ko-tsayko-gewn ” or “ 99 islands. ” It is entirely leafless, \* of the thickness of a small rattan, or say, the little finger, and scrambles up and over trees to an indefinite length. My specimen was about 30 ft. long, but Lindley speaks of it, or a similar species (*G. altissima*? *B. G.*), as being 50—120 ft. long. Colour of stem reddish brown, and the place of leaves is supplied by stiff leathery scales, at long intervals. It supports itself by aerial roots, and its flowers are in racemes of a yellow colour and about 1 in. across. *Parish.*

A lofty climber ; branches much stouter than *G. altissima* ; inflorescence loosely branched, flowers much larger,  $\frac{3}{4}$  in. diam., sepals and petals broader, and lip without the flat ridge and tuft of wool.

Tenasserim ; Moulmein, *Parish (fd. Hook f.)*.

*Hook. f. Fl. Brit. Ind. vi. 89 ; C. P. 70.*

SYN.—*G. altissima*? Rchb. f. in Trans. Linn. Soc. xxx. 135.

*Vanilla pterosperma*, Lindl. in Wall. Cat. 7402.

? *V. rubiginosa*, Griff. Notul. iii. 247.

*Erythorchis altissima*; Lindl. Gen. and Sp. 438 in part (not of Blume).

\* Parish elsewhere remarks this is the only truly leafless orchid known to him. *B. G.*

**VANILLA**, Swartz.

Climbing, rooting, branched, leafy or leafless shrubs; stems terete or angled. *Leaves* subsessile, coriaceous or fleshy. *Peduncles* short, axillary; flowers large. *Sepals* and *petals* subequal, spreading. *Lip* with the claw adnate to the column, which is embraced by its broad concave limb. *Column* elongate; anther incumbent, cells separate; pollen granular. *Capsule* long, fleshy, 1-celled, loculicidally 3-valved, without septa. Hook. f.

**1. V. Parishii**, Rehb. f. *Otia Bot. Hamb.* 39.

Flowers 1—1½ in. long, sepals linear-oblong, tips dilated cuspidate, petals broadly oblanceolate acuminate, lip trumpet-shaped, epichile small ovate or rounded crisped with a thick belt of long hairs down the centre and a dense brush at the base, side lobes with long scattered hairs within.

Tenasserim, *Parish* (in the same jungles as *Galeola hydra*).

This may prove the same as *V. Wightiana*, Lindl. It is very near the Javanese *V. aphylla*, Blume. *Hook. f. Fl. Brit. Ind.* vi. 90.

C. P. 286.

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**KEY TO SPECIES.**

**VANILLA**, \* Swartz.

\* Stem leafless.

No. 1, *V. Parishii*.

\* \* Stem leafy.

No Burmese species.

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**PONGONIA**, Griff. •

A small genus of terrestrial orchids with round tubers, 1—1½ in. in diam., which have short rigid papillæ (roots?) projecting from their

\* See Appendix A, Genus 76.

surface at all points. The flowers are borne either singly or in loose drooping racemes on a leafless scape, which springs from the centre of the bulb, and is a few inches high, and has several sheathing scales. After this flowering scape, and when the flowers are faded, a solitary leaf appears, which takes its rise either at the base of the flowering scape, and close to it, or a little way up, and has also sheathing scales at its base. The flowers, which vary from 1—2 in. in length, and are generally drooping, have long lanceolar, nearly equal, sepals and petals, which are free, but connivent (rarely expanded). The lip is long, undivided, or slightly 3-lobed, parallel with the column, and convolute round it, occasionally with a very short blunt spur. The column is also rather long, and somewhat club shaped, and terminated by a lid-like anther. The pollen masses are 4, granular, long and tapering, without a gland. The leaves are large, rounded and heart-shaped, many-nerved and plicate, or fan-like. In one species they are smooth and green; in a second clothed with tawny hairs; in a third copper-colour; and in a fourth dark-green, with a purple-black spot between every nerve. The flowers also vary much in colour, being green, or of different shades of white, pink or purple. The germ is very short; I have never seen the fruit. They are propagated (as Roxburgh correctly says) by suckers from the petiole just below the ground. The flowers come up in the rainy season, the leaves *after* the rains; consequently it is not easy to secure them. The best way is to dig up the roots and plant them in the garden. *Parish.*

1. ***P. carinata***, Lindl. Gen. and Sp. 414; in Journ. Linn. Soc. iii. 45 (excl. syn. Griff.).

Leaf orbicular or cordate 7—9-nerved glabrous, sepals and petals narrowly oblanceolate acuminate, lip 3-lobed about the middle pubescent, side lobes very short, midlobe broadly ovate acute crenate, nerves rectangular.

Pegu, *Kurz.*

*Leaf* 1½—2½ in. diam., cuspidate, not waved; petiole 1—2 in.

*Flowering-stem* with raceme 6—12 in., green; bracts ½ in.; sepals and petals 1 in., green; lip not saccate at the base, white with red

or purple veins. I am unable to discriminate satisfactorily in Herbarium specimens of the flower (carefully moistened and laid out) between this and *flabelliformis*. *Hook. f.* Fl. Brit. Ind. vi. 121.

? Dalz. and Gibs. Bomb. Fl. 270.

SYN.—*Epipactis carinata*, Roxb. Fl. Ind. iii. 452.

## 2. *P. cuprea*, Parish MSS; C. P. 166.

Amongst Parish's drawings is one of a Moulmein plant (*P. cuprea*) like *P. juliana*, but with purple-green sepals and petals, and the hypochile longer than the epichile; it is in flower only. *Hook f.* Fl. Brit. Ind. vi. 119.

The following is the description of *P. juliana*, Wall. Cat. 7399 (non-Burman). *B. G.*

Leaf ovate-cordate glabrous, stem 1-flid., lip with 2 narrow falcate side lobes near the base which embrace the column, and a longer rhombic-lanceolate acuminate midlobe which is hairy at its base. *Tuber* globose. *Leaf* 2—3 in., 5—7-nerved, green or purple beneath; petiole short. *Flowering-stem* 3—6 in.; bracts ensiform; flower about 2½ in. diam.; sepals and petals narrowly oblanceolate, acuminate, green; side lobes of lip white, midlobe spreading, white mottled with pink. *Hook f. l. c.*

*Hook. f.* Ic. Plant. ined.

SYN.—*Epipactis juliana*, Roxb. Fl. Ind. iii. 433.

## 3. *P. flabelliformis*, Lindl. in Wall. Cat. 7400; Gen. & Sp. 415; in Journ. Linn. Soc. iii. 45.

Leaf large orbicular-cordate many-nerved, lip 3-lobed about the middle, side-lobes obtuse, midlobe ovate acute crisped and hairy.

Tenasserim, Parish.

*Leaf* 4—10 in. diam., cuspidate, margin waved; petiole 4—8 in. *Flowering-stem* stout, 6—12 in.; raceme lax-flid.; flowers pale green; sepals ¾ in. long, linear-lanceolate, acute; petals rather narrower, obtuse; lip shorter than the sepals, like that of *carinata* white and glabrous. Differs from *P. carinata* in the many-nerved leaf; the flowers, are not readily distinguishable in dried specimens. In a drawing



by Parish the lip is represented as saccate at the base, truncate at the apex, with 3 green medial nerves meeting in the apex, and many red side nerves. In his specimen the tip of the lip varies to rounded, the side lobes are rounded, and its nerves are not rectangular but ascending.

*Hook. f. Fl. Brit. Ind. vi. 121.*

? Dalz. and Gibs. Bomb. Fl. 270 ; C. P. 164.

SYN.—*P. nervilia*, Blume, Mus. Bot. i. 32.

*P. carinata*, Wight Ic. t. 1720.

*Nervilia Aragoana*, Gaud. in Freyc. Voy. Bot. 422, t. 35. \*

**4. *P. maculata***, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 143 ; C. P. 165.

Leaf orbicular-cordate glabrous, stem 2-flid., lip shortly spurred at the base embracing the column ovate-lanceolate 3-lobed about the middle woolly within.

Tenasserim ; at Moulmein, *Parish*.

*Leaf* about 2 in. diam. about 13-nerved, green with a black-purple spot at the base of each fold beyond the middle ; petiole 2—3 in. *Flowering-stem*, 5—6 in., slender ; bracts minute ; sepals and petals  $\frac{3}{4}$  in., narrowly oblanceolate, green ; lip equalling the sepals, yellow-green with dark-green veins ; column rather slender ; anther purple.

*Hook. f. Fl. Brit. Ind. vi. 120.*

*Hook. f. Ic. Plant. ined.*

**5. *P. pulchella***, Parish MSS ; C. P. 322.

Has a 2-flid. scape : flowers with a rose-cold. lip, green at the base. Sepals and petals also pink and expanded. I have not seen the leaves. *Parish*.

Not given by Hooker, but is probably the plant referred to in the following note under *P. biflora* (Malabar). *B. G.*

Amongst Parish's drawings is one of a similar Moulmein plant in flower only, with red-brown stem, pink sepals and petals, and a more clavate column than in Wight's figure (of *P. biflora*). *Hook. f. Fl. Brit. Ind. vi. 119.*

**6. *P. Scottii***, Rchb. f. in Flora, 1872, 276

Leaf large reniform many-nerved glabrous, flowering-stem tall stout, sepals and petals connivent linear-lanceolate acuminate, lip subclawed, base saccate, 3-lobed about the middle, side lobes obtuse, midlobe suborbicular velvety.

? Burma, *Griffith*.

Leaf 8 in. diam., abruptly acuminate, green, margin subundulate ; petiole 12 in., very stout. *Flowering-stem* dark brown, with raceme 18 in. ; bracts  $\frac{3}{4}$  in., reflexed ; flowers horizontal, almost geniculate with the decurved ovary ; sepals and petals  $\frac{3}{4}$  in., connivent, dull green with red nerves ; lip as long, yellow-white with purple nerves ; top of column hairy on the back. Lindley refers Griffith's plant to *P. carinata*, but the saccate base of the lip, and flowers set on at an angle with the ovary, rather indicate *P. Scottii*. These characters are not, however, shown in Griffith's drawing. *Hook. f. Fl. Brit. Ind. vi. 120.*

? Pogonia No. 2, Griff. Notul. iii. 377 ; Ic. Pl. Asiat. t. 345.

7. *P. velutina*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 142 ; C. P. 182.

Leaf orbicular-cordate, velvety on both surfaces, stem 2-fl'd., lip shorter than the sepals embracing the column oblong-ovate obtuse.

Tenasserim ; at Moulmein. *Parish*.

Leaf 5—6 in. diam., many-nerved, rust-cold. ; petiole very short.

*Flowering stem* 4—12 in. ; bracts very small ; sepals and petals  $1\frac{1}{2}$  in. long, narrowly lanceolate, dirty purple ; lip ventricose towards the middle, flushed with pink, with 2 red-purple branching nerves down the middle ; column gibbously clavate. *Hook. f. Fl. Brit. Ind. vi. 119—120.*

## KEY TO SPECIES.

POGOINA, \* Griff. Sect. Nervilia.

Terrestrial tuberous 1-leaved herbs, leafing after flowering. *Leaf* very broadly cordate or orbicular strongly plicate. *Flowers* solitary,

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\* See Appendix A, Genus 98.

few, or many, racemed, horizontal or pendulous. *Sepals* and *petals* subequal, narrow, connivent or widely spreading. *Lip* inferior, adnate to the base of the column, sessile or subclawed, usually narrow, entire or 2-fid or 3-lobed; spur a very short sac. *Column* elongate, tip clavate, stigma oblong or broader; rostellum short; anther substipitate; pollinia 2 or 4. *Capsule* erect or pendulous.

The above characters apply exclusively to the section *Nervilia* (genus of Gaudichaud), to which all the Old World species of *Pogonia* belong; and which all flower before leafing. All the other species, except one Japanese, are New World, and their flowering-stems bear leaves. The species are very difficult of analysis from Herbarium specimens, but I have been greatly aided by the drawings in Herb. Kew, and those of Herb. Calcutt., kindly lent by Dr. King. All want revision.

\* Stem 1—3-fld.

No. 1, *P. carinata*; No. 2, *P. cuprea*; No. 4, *P. maculata*; No. 5, *P. pulchella*; No. 7, *P. velutina*.

\* \* Flowers racemose. Bracts elongate, linear-lanceolate, reflexed.

No. 3, *P. flabelliformis*; No. 6, *P. Scottii*.

## Tribe VI. NEOTTEÆ.

"Anther dorsal," Lindley.

### CNEMIDIA, Lindley.

Forms Section I. of *Tropidia*, Lindl. q. v. in Hooker's Flora of British India. *B. G.*

#### 1. *C. semilibera*, Lindl. Gen. and Sp. 463.

Leaves elliptic or ovate acuminate 9—11-nerved, spike many-fld., bracts slender spreading, lip oblong.

Tenasserim, *Parish*. Upper Burma, *Griffith*.

*Stem* 8—12 in. *Leaves* 3—5 by 2—3 in.; base rounded or cordate. *Peduncle* short; spike 1—2 in.; bracts  $\frac{1}{2}$ — $\frac{3}{4}$  in., as long as the flowers; sepals 3—5-nerved, lateral lanceolate, acuminate, connate nearly to the apex, dorsal linear-lanceolate, acute; petals rather narrower, ovate-lanceolate, obtuse, 3—5-nerved, midnerve very stout; lip nearly as long as the petals, obtuse, lateral nerves narrowly lamellate below

the middle ; column with a long slender rostellum ; anther narrowly lanceolate ; pollinia clavate, grains lamelliform, caudicle long slender, gland minute.

I have examined Lindley's specimen of *Tropidia semilibera*, and find that he was in error in supposing that the lateral sepals are free to below the middle ; it does not differ from *T. angulosa*. *Hook. f. Fl. Brit. Ind.* vi. 92—93.

C. P. 239.

*SYN.*—*Tropidia angulosa*, Blume Orchid. Archip. Ind. 122 ; *Hook. f. l. c.*

*T. Govindovii and semilibera*, Blume l. c.

*Decaisnea angulosa*, Lindl. in Wall. Cat. 7388.

*Cnemidia angulosa*, Lindl. Gen. and Sp. 463.

*Govindia nervosa*, Wight Ic. t. 2090.

## MONOCHILUS, Wall.

Forms Section II. of *Zeuxine* q. v. in Hooker's Flora of British India. *B. G.*

A small genus of terrestrial tropical orchids included by Bentham under *Zeuxine*, but kept distinct both by Lindley and Reichenbach. It differs from *Anæctochilus* in the absence of a spur, and in the adhesion of the lip with the column, and from *Zeuxine* in its long membranous split lip. It contains a few species only, which are natives of India and Ceylon. It requires the general treatment of *Anæctochilus*, and is a free growing plant, which may be cultivated without the assistance of a bell glass. *Williams.*

Parish remarks of *Monochilus* and *Anæctochilus*, "their flowers, though botanically interesting, are of no beauty. Their attraction lies in their leaves, some of which are extremely lovely both for their colouring and the exquisite veining on their upper surface. They are much prized in England, and are carefully grown in hot-houses under bell glasses, as they require an atmosphere abundantly charged with moisture to keep them alive. This is the reason they cannot endure the plains in Burma, but affect the mountains where the air is cooler

and the atmosphere much more moist all through the year. Among the most beautiful species known are *M. regius*, a Ceylon plant, possibly to be found in Burma, and *A. setaceus* and *A. Dawsonianus*, which are found in its forests. These two genera, although terrestrial, may be almost said to be epiphytal, for they rest but lightly upon decayed leaves and sticks, together with which they may be lifted having no real attachment to the soil."

1. *M. affine*, Lindl. Gen. and Sp. 487 (excl. hab. Courtallum).

Leaves ovate or ovate-lanceolate, spike and ovaries pubescent, lip longer than the sepals, wings obovate-oblong or subcuneate.

Burma at Taong Dong, Wallich. Tenasserim; at Moulmein, Lobb, Parish.

Very like *Zeuxine flava* (*M. flavum*), but the flowers are much larger and more numerous, the sepals  $\frac{1}{4}$  in. long, and the pollinia are pyriform, attached by an elastic caudicle to the oblong gland. *Hook. f.*

Wight Ic. t. 1728; C. P. 241.

SYN.—*Zeuxine affinis*, Benth. in Gen. Plant. iii. 600; Fl. Brit. Ind. vi. 109.

*Eteria affinis*, Lindl. in Wall. Cat. 7383.

*E. flava*, Wall. Cat. 7380 C.

*Ætheria mollis*, Lindl. in Journ. Linn. Soc. i. 184.

Parish gives *Eteria Mollis*, and the references Lindl. Journ. Linn. Soc. i. 184; Burma Griffith; C. P. 238. The first of these is to *Ætheria mollis*, as above, but the reference to the drawing seems to indicate that this is a variety. *B. G.*

2. *M. flavum*, Wall. in Lindl. Gen. and Sp. 487; in Journ. Linn. Soc. i. 187.

Leaves ovate acute, spike glabrous or pubescent, flowers very small, lip shorter than the sepals, wings broadly obovate or hatchet shaped.

Tenasserim, Helfer, Griffith.

Stem usually elongate, slender. Leaves 1—1½ in., usually scattered, petioled or not; sheath usually much inflated, hyaline. Scape

3—6 in., very slender; spike 1—1½ in., lax-flid.; bracts usually exceeding the ovaries; sepals  $\frac{1}{10}$  in., obtuse; lip included, sac with 2 long spurs within; anther ovate-lanceolate; pollinia subglobose, attached by a simple caudicle to the lanceolate gland. Much the smallest flowered species. A drawing in Herb. Peradeniya represents the flowers as white with a red lip. *Hook. f. Fl. Brit. Ind. vi. 108.*

C. P. 326.

SYN.—*Zeuxine flava*, Benth. in Gen. Plant. iii. 600; Hook. f. l. c.

*Etaria flava*, Lindl. in Wall. Cat. 7380 A. B.

### 3. *M. galeatus*, Lindl. in Journ. Linn. Soc. i. 187.

Leaves ovate green with a median pale stripe, spike nearly glabrous, lip cymbiform terminal, lobe orbicular or oblong concave membranous.

Pegu, *Kurz in Herb. Calcutt.*

*Stem* 2—4 in. *Leaves* 1—1½ in., sessile or shortly petioled, obtuse acute or acuminate, sheaths short. *Scape* 3—6 in., slender; spike lax-flid.; bracts equalling the glabrous ovary; sepals  $\frac{1}{4}$  in. long, dorsal ovate, acute, lateral lanceolate 1-nerved; petals falcate, very obtuse; lip wholly included, coriaceous, with 2 short spurs within; rostellar arms small; stigmatic lobes distant; pollinia pyriform, attached by a slender caudicle to the oblong gland. *Hook. f.*

SYN.—*Zeuxine goodyeroides*, Lindl. Gen. and Sp. 486; Fl. Brit. Ind. vi. 107.

## CHEIROSTYLIS, Blume.

### 1. *C. flabellata*, Wight. Ic. v. 16.

*Scape* glandular-pubescent, flowers subcorymbose, limb of lip suborbicular deeply 2-cleft, lobes sub 5-fid, appendages of column subspathulate.

Tenasserim, *Parish.*

*Stem* sometimes moniliform below. *Leaves* ½—¾ in., petioled, ovate, acute. *Scape* 6—8 in.; sheaths and bracts loose, acuminate;

flowers 2—10, white, glandular-pubescent, perianth hemispheric; petals linear-oblong, falcate; sac of lip cymbiform, with 2 calli within; base, hairy, claw short with 2 green spots; column very short, appendages subterminal and rostellar arms both subspathulate; anther with a dilated membranous tip; pollinia pyriform, subsessile on the elongate lanceolate gland. *Hook. f. Fl. Brit. Ind. vi. 106.*

Lindl. in Journ. Linn. Soc. i. 187; Thwaites Enum. 313 (excl. in both Syn. Zucuxine); Dalz. and Gibbs. Bomb. Fl. 271; C. P. 341.

SYN.—*Monochilus flabellatus*, Wight. Ic. t. 1727.

*Goodyera flabellata*, A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 79, t. 12.

## 2. *C. Griffithii*, Lindl. in Journ. Linn. Soc. i. 188.

Scape pubescent, flowers 1—3 large, limb of lip reniform lacinate, appendages of column linear.

Tenasserim; on Mt. Tungoo, *Parish*.

*Stem* below prostrate. *Leaves* 1 in., shortly petioled, ovate, acuminate; sheaths very large, cupular, hyaline. *Scape* 3—8 in., slender; sheaths and bracts large, loose, lanceolate; flowers nearly 1 in. long with the ovary, white with two green spots on the lip; sepals connate to the middle; petals narrowly spathulate; base of lip elongate, concave, with 2 series of glandular setæ within; claw short. *Capsule*  $\frac{3}{4}$  in., pedicelled, pyriform. *Hook. f. Fl. Brit. Ind. vi. 105.*

C. P. 236.

SYN.—*Goodyera* No. 9, Griff. Notul. iii. 393.

## 3. *C. malleifera*, Par. and Rchb. f. in Trans. Linn. Soc. xxx. 141; C. P. 248.

Glabrous, leaves very small ovate acute, raceme 3—5-fl., lobes of lip entire.

Tenasserim; on Zwakabin, *Parish*.

*Stem* not moniliform. *Leaves* rather more than  $\frac{1}{6}$ — $\frac{1}{2}$  in., scattered, acute acuminate or aristate; lip with quite entire, somewhat hatchet-shaped lobes; anther with a dilated membranous apex. From *Hook. f. Fl. Brit. Ind. vi. 105.*

4. *C. pubescens*, Par. and Rehb. f. in Trans. Soc. xxx. 141; C. P. 154.

Scape pubescent, limb of lip 2-lobed, lobes subquadrate crenate, appendages of the column cuneately obovate much shorter than the subspathulate arms of the rostellum.

Tenasserim; at Moulmein, *Parish*.

*Stem* stout, ascending. *Leaves*  $1\frac{1}{2}$ —3 in., ovate, or ovate-lanceolate, acuminate; petiole slender. *Scape* 3—6 in.; sheaths and bracts lax, acuminate; raceme 3—10-fl.; perianth  $\frac{1}{3}$  in. long; sepals connate to the middle; lip with a small concave 3-nerved base, lateral nerves with one slender callus; claw rather broad; anther truncate. *Capsule*  $\frac{1}{2}$  in., pyriform, pedicelled. *Hook. f. Fl. Brit. Ind. vi. 106.*

#### KEY TO SPECIES.

##### **Cheirostylis**,\* Blume.

Terrestrial herbs. *Leaves* membranous. *Flowers* small, racemed. *Sepals* connate in a gibbous based tube to the middle. *Petals* narrow. *Lip* inserted at the base of the column, erect, narrow, base saccate, limb shortly clawed broadly dilated entire toothed or crenate. *Column* short with 2 appendages in front, rostellum 2-cleft; stigmatic lobes lateral; anther erect, cells short; pollinia 2, caudicle short, gland oblong.

\* *Appendages of column as long as the rostellum.*

No. 2, *C. Griffithii*; No. 3, *C. malleifera*.

\*\* *Appendages of column shorter than the short rostellum, rarely as long.*

No. 1, *C. flabellata*; No. 4, *C. pubescens*.

##### **HÆMARIA**,† Lindl.

Terrestrial herbs; caudex creeping. *Leaves* petioled. *Flowers* racemed. *Sepals* subequal, free; dorsal erect forming a hood with

\* See Appendix A, Genus 90.

† See Appendix A, Genus 85.



the petals; lateral broad, widely spreading. *Lip* adnate to the base and sides of the column, elongate with a small basal sac which is concealed by the sepals; sides winged or auricled, blade of 2 spreading lobes, sac with 2 large internal calli. *Column* very large, clavate, stigma anticous; anther large, subhorizontal, cells distinct; pollinia 2, clavate, sulcate, granular, attached by a fleshy gland to the forked rostellum. *Hook. f.*

Should be grown in 5- or 6 -inch pots, several plants being put into a pot so as to make up a good specimen (about 6 plants). They should be grown vigorously so as to ensure an abundance of bloom. Even without any flowers the plants themselves are by no means unattractive. *Williams.*

### 1. *H. discolor*, Lindl. Gen. & Sp. 490.

A very handsome and free blooming dwarf orchid of the variegated foliage group. It grows about 10 in. high, and has deep purple fleshy stems, clothed with ovate leaves of a beautiful dark velvety green, purplish red beneath, and having a white bar in the centre through their entire length. The flowers are white, with a little yellow in the centre, and are produced in winter, lasting a long time in perfection. *Williams.*

*Caudex* very short. *Stem* ascending from the base, 6—10 in., stout or slender, pubescent. *Leaves* subradical, 1—3 in., shortly petiolated, elliptic or ovate, apiculate, fleshy, dark red beneath. Racemes many-fl.; rachis and ovary tomentose; bracts pinkish, broadly ovate, apiculate, 1-nerved, nerve with flexuous nervules; sepals linear 1-nerved; lip longer than the sepals, recurved; sac small, 2-lobed; claw with dilated sides; lobes of limb divaricate, quadrately oblong. *Hook. f.* Fl. Brit. Ind. vi. 101—2.

Not given by Hooker as Burmese, but named in Parish's list. *B. G.* Miq. Choix. Pl. t. 16; C. P. 236.

SYN.—*Ludisia discolor*, A. Rich. in Dict. Class. Hist. Nat. vii. 457; Blume Orchid. Archip. Ind. 113, 114, t. 34, f. 2, 3, and t. 42.

*Goodyera discolor*, Ker. in Bot. Reg. t. 271; Bot. Mag. t. 2055; Lodd. Bot. Cab. t. 143.

*Myoda rufescens*, Lindl. in Wall. Cat. 7390; Gen. & Sp. 489.

Var. *Dawsoniana*, Rchb. f.

A very ornamental leaved variety, which was at first distributed as an *Anæctochilus*. The leaves are large, ovate, stalked, blackish-bronzy green on the upper side, and very glossy, with about 7 bold lines of a beautiful golden-coppery hue traversing them from base to apex, and connected by smaller reticulations of the same colour; the under side is of a uniform dull purple. The flowers, which are white, are freely produced, and become useful for bouquet making. *Williams*.

Moulmein, Rchb. f. in Trans. Linn. Soc. xxx. 142.

Reichenbach's Var. *Dawsoniana* from Moulmein consists of leaves only, and is probably an *Anæctochilus*; it may or may not be his Var. *Dawsonianus* with red reticulations on the leaves. *Hook. f. l. c. Fl. des Serres*, t. 1083.

SYN.—*Anæctochilus Dawsonianus*, Low in Gard. Chron. 1868, 1038; Rchb. f. in Gard. Chron. 1872, 321; C. P. 172.

*Anæctochilus Dawsonianum*, Williams.

*Goodyera Dawsoniana*, Williams.

## HETÆRIA, \* Blume. (ETÆRIA).

ÆTHERIA, Endl.

Characters of *Goodyera*, but lip usually superior, and adnate to the sides of the column, and stigma with 2 lateral lobes. *Hook. f.*

### 1. *H. Helferi*, Hook. f. Ic. Plant. ined.

Slender, leaves elliptic, spike puberulous twisted, bracts shorter than the flowers, petals linear-falcate, lip membranous cymbiform acuminate with a few fleshy cilia on each side towards the base within.

Tenasserim; Misses Eider Islands, *Helfer*.

Stem 6—10 in. with the raceme. Leaves 3—4 in., acute, many-nerved, membranous. Spike 3—6 in.; bracts narrowly lanceolate; sepals  $\frac{1}{6}$  in. long, subequal, ovate-oblong, obtuse, hairy, 1-nerved; lip small;

\* See Appendix A, Genus 94.

column short with 2 membranous wings in front, and very short rostellar arms ; anther ovate-cordate. *Hook. f. Fl. Brit. Ind. vi. 115.*

**H. Moulmeinensis**, see *Zeuxine Moulmeinensis*.

**H. mollis**, see *monochilus affine (Zeuxine affinis)*.

**2. H. rubens**, Benth. in *Gen. Plant. iii. 164.*

Tall, leaves elliptic acute, spike puberulous, bracts equalling or exceeding the flowers, petals hammer-shaped, lip subhemispheric with a small transverse terminal lobe and a jagged callus on each side towards the base within.

Upper Burma, *Griffith (Kew Distrib. 5341 and 5342).*

Rather stout, 10—18 in. high. *Leaves* 4—5 by  $1\frac{3}{4}$ —2 in. (reticulately nerved in the Sikkim specimen) ; flowers large, greenish-purple, sepals 1-nerved, broadly ovate ; petals clawed, very gibbous on one side, lip short, terminal lobe sometimes 2-fid (usually 3-fid) ; column very short indeed, with 2 small wings in front ; anther ovate cordate ; pollinia pyriform, subsessile on the gland, stigmatic lobes large, rostellar arms very short. *Hook. f. Fl. Brit. Ind. vi. 115.*

*Hook. f. Ic. Plant. ined.*

*SYN.—Rhamphidia rubens*, Lindl. in *Journ. Linn. Soc. i. 182.*

*Cerochilus rubens*, Lindl. in *Gard. Chron. 1854, 87.*

*Goodyera*, No. 4, *Griff. Notul. iii. 390.*

## ZEUXINE, Lindl.

**1. Z. Moulmeinensis**, *Hook. f.* \*

Slender, leaves elliptic, spike glandular-pubescent, few-fld., bracts ovate-lanceolate shorter than the slender glabrous ovaries, sepals and petals aristately acuminate, sac of lip large globose didymous with 2 large calli within, claw straight rigid, lobes narrowly falcately cuneate lacerate.

Tenasserim ; at Moulmein, *Lobb, Parish.*

*Stem* slender, with the spike 12—18 in. *Leaves* 2—3 in., elliptic acute or acuminate, membranous ; petiole 1 in., slender. *Spike* 2—3 in., few-fl. ; flowers not secund, spreading ; ovary slender  $\frac{1}{2}$  in. long ; sepals membranous, 1-nerved, dorsal ovate, lateral much broader ; petals broadly dimidiate ovate with recurved points ; sac of lip with caruncled callous sides, sub 4-celled by imperfect transverse and longitudinal septa, claw slender pubescent, lobes divaricate as long as the rest of the lip ; column very short and stout with projecting cheeks on the anterior face ; rostellum short, 2-fid ; anther short, ovate, obtuse ; pollinia pyriform, attached to the gland by very short caudicles. Possibly a *Cystorchis*. *Hook. f. Fl. Brit. Ind. vi. 109.*

*SYN.—Eteria Moulmeinensis*, Par. and Rehb. f. in *Trans. Linn. Soc. xxx. 142* ; C. P. 237.

**Z. affinis**, see *Monochilus affine*.

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#### KEY TO SPECIES.

##### ZEUXINE,\* Lindl.

Terrestrial herbs ; stem creeping below. Leaves membranous. *Flowers* small, spicate. *Sepals* subequal, dorsal concave, cohering with the petals ; lateral free. *Lip* inferior, adnate to the base of the column, cymbiform or saccate with a shortly-clawed or sessile entire 2-lobed or 2-winged terminal lobe ; sac with 2 calli or spurs near the base within. *Column* very short, 2-keeled or -winged in front ; stigmatic lobes 2, marginal, distant ; anther membranous, cells contiguous ; pollinia pyriform, attached by an oblong gland to the erect rostellum with often an intermediate appendage or a linear caudicle.

I refer to Zeuxine those species of *Heteria* that have large terminal lobes to the lip. The appendage between the gland of the pollinia and the pollinia itself is a very curious organ, and its real nature has not been ascertained, whether rostellar or pollinar ; it occurs only in some species, and in these under very various forms, so that it cannot be relied on as a generic character. It is further so difficult of analysis in dried specimens that much allowance must be made for my description of it.

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\* See Appendix A, Genus 91.

## Section I. EUZEUXINE.

No Burmese species.

Section II. MONOCHILUS. (See *Gen. Monochilus*).

\* Claw of terminal lobes short with involute margins.

† *Terminal lobe of lip very small, entire or subentire.*

*Z. goodyeroides (Monochilus galeatus).*

† † *Terminal lobe of lip 2-winged.*

*Z. flava (M. flavum); Z. affinis (M. affine).*

\*\* Claw of terminal lobe of lip slender, not margined.

*Z. Moulmeinensis.*

## GOODYERA, Br.

1. *G. foliosa*, Benth. in Herb. Kew.

Stem with an elongate decumbent, base leafy to the tip, leaves petioled ovate-lanceolate, spike glandular-pubescent, bracts much exceeding the flowers, sepals  $\frac{1}{4}$ — $\frac{1}{3}$  in., 3-nerved, lip saccate, beak rather dilated, base within copiously setose, column short, rostellar arms very long slender, anther lanceolate.

Burma, *Griffith*.

*Stem* 6—12 in., rather slender. *Leaves*  $1\frac{1}{2}$ — $2\frac{1}{2}$  in., oblique, acute, green, 3—5-nerved, not reticulate; petiole  $\frac{1}{3}$ — $\frac{2}{3}$  in., sheath short. *Spike* 2—3 in.; bracts  $\frac{1}{2}$ — $\frac{2}{3}$  in., nearly glabrous; flowers pink; sepals ovate-lanceolate, obtuse, 1-nerved; petals dimidiate-oblong, as broad as the dorsal sepal, 1-nerved; pollinia with slender united caudicles. Distinguished from all others of this section by the elongate and leafy stem, except *G. vittata* (Sikkim Himalaya), which has a glabrous spike. *Hook. f. Fl. Brit. Ind. vi. 113.*

SYN.—*Georchis foliosa*, Lindl. Gen. & Sp. 496; C. P. 240.

*G. secundiflora*, Griff. Notul. iii. 393 (excl. plate).

—*Goodyera* Sp. Griff. It. Notes, 36, No. 591; Notul. iii. 396, No. 11; Ic. Pl. Asiat. 346, f. 1.

## KEY TO SPECIES.

## GOODYERA,\* Br.

Terrestrial leafy herbs; stem short, or elongate and creeping below. *Leaves* subradical, petioled. *Flowers* small, in often twisted spikes. *Sepals* subequal, dorsal erect, concave, forming a hood with the narrow petals; lateral free, erect or spreading, covering the sac of the lip or not. *Lip* inferior, sessile at the base of the column, entire, cymbiform or subsaccate, usually acute, naked or setose within. *Column* various; top cupular; stigma broad, anticous; rostellum erect; anther-cells distinct; pollinia granular, caudicled or not, pendulous from the rostellar gland.

\* *Stem* tall, stout, 18 in.—2 ft. *Leaves* large, suberect, petioled lanceolate or elliptic lanceolate acuminate. The species of this group, are not allied *inter se*, agreeing only in stature.

No Burmese species.

\* \* *Stem* 4—8 in., rarely more. *Leaves* 1—2 in., usually rosulate, ovate-cordate or lanceolate.

† *Lip* smooth channelled or lamellate within, but with no hairs or soft setae.

No Burmese species.

† † *Lip* within setose and tubercled.

No. 1, *G. foliosa*.

**TROPIDIA**, Lindl.

1. **T. curculigoides**, Lindl. in Wall. Cat. 7386A; Gen. and Sp. 497.

Bracts ovate acuminate, lip with a reflexed tip a thickened midnerve and intramarginal ridges from beyond the middle to the base of the reflexed tip.

Burma, *Wallich*, "ad ripas fluminis Attaran."

\* See Appendix A, Genus 93.

*Stem* 1—2 ft. *Leaves* 6—10 by 1—1¾ in., elliptic- or linear-lanceolate, caudate-acuminate, 5-nerved. *Spikes* ½—¾ in., erect or decurved; bracts imbricate, ¼ in., ovate-lanceolate, upper narrower; sepals ½ in. long, strongly 5-nerved, dorsal linear-lanceolate, lateral strongly recurved, lanceolate from an ovate base, taper-pointed; petals rather shorter, obliquely ovate-oblong, obtuse, 5-nerved; lip much shorter than the sepals. *Capsule* ¾ in. long. Wallich's 7386B from Burma is a different species, but is in too imperfect a state for analysis. *Hook. f. Fl. Brit. Ind. vi. 93.*

C. P. 338.

SYN.—*T. assamica*, Blume Orchid. Archip. Ind. 124, t. 41, f. 2.

**2. *Tropidia* Sp.** (*T. curculigoides*, Kurz, from the Andaman Islands.)

A small slender species, with lanceolate subacute 3-nerved leaves 2—3 by ½—⅔ in. Imperfectly known. *Hook. f. Fl. Brit. Ind. vi. 94.*

## KEY TO SPECIES.

### TROPIDIA,\* Lindl.

Terrestrial, glabrous leafy herbs. *Stem* often branched, roots rigid. *Leaves* sessile, membranous, subplicate; petiole sheathing. *Flowers* small, in axillary and terminal sessile or peduncled spikes; bracts coriaceous, often imbricate, strongly nerved. *Sepals* connivent, lateral more or less connate, dorsal free. *Petals* as long, or shorter, broad or narrow. *Lip* superior, sessile at the base of the column, cymbiform or produced into an obtuse spur, undivided, acute or with a reflexed tip, disk with short or long intramarginal ridges or lamellæ; column short or long, rostellum long, erect, at length 2-fid; stigma anticus; anther erect, acute or acuminate, cells contiguous; pollinia 2, clavate, 2-cleft, caudicle long or short, gland small. *Capsule* cylindric oblong.

### Section I. CNEMIDIA. (See *Cnemidia* Gen.)

#### *T. angulosa.*

See Appendix A, Genus 78.

## Section II. TROPIDIA PROPER.

\* *Flowers in short sessile axillary or axillary and terminal spikes.*

No. 1, *T. curculigoides*.

\* \* *Flowers in peduncled spikes.*

No Burmese species.

## IMPERFECTLY KNOWN SPECIES.

No. 2, *Tropidia Sp.*, Kurz.

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**ANÆCTOCHILUS**, Blume.

Some of the terrestrial orchids are remarkable for the extreme beauty of their foliage, to match which from any other order of the Vegetable Kingdom would be a matter of difficulty. Amongst these the Anæctochili are gems of the first water; they are found growing in the most humid situations under the shade of trees. They are mostly natives of the Indian Isles, where they obtain all the free circulation of air consequent on proximity to the sea; their leaves are usually almost rounded in form, and of the texture of the finest velvet; in colour sometimes the most brilliant metallic emerald green, and sometimes a rich warm brown or fine olive colour. In some varieties there is a broad band of a lighter hue from the base to the tip of each leaf. Many in addition are covered all over with a fine network of shining gold or silver, which in sunlight sparkles with reflected lustre, each rib and vein brought into grand relief upon the mellow tone of the general surface of the leaf. In habit they differ materially from most orchids in having thick fleshy rhizomes which spread along just under the surface of the ground, throwing their fine fibrous roots down into the earth, and the growing shoots, which rise to the height of from 2—6 in., from the joints. They are all dwarfs and of compact growth. As these plants are valued entirely on account of their foliage, and as to bloom is always a severe effort on the part of a plant, by which it is not unfrequently weakened, these delicate gems may well be spared the exertion of flowering. The best material in which to grow such



plants as *Anæctochili*, and the closely allied species, *Macodes* and *Goodyera*, is a compost of leaf mould and silver sand, with a considerable admixture of lumps of charcoal, the usual precaution being taken to secure perfect drainage. It is best to grow them under a bell glass, tilted on one side to furnish ventilation; or, better still, under small glass frames, such as are generally used for ferns, with a lid at the top to admit of fresh air. In watering, care must be taken not to wet the leaves. Many species are deciduous, and die down to the roots in the cold weather. The pots should then be kept dry, as these plants require a couple of months' rest. Watering should then be recommenced very cautiously, and about the month of May, they will again be in all their beauty. If kept confined in too close an atmosphere they are very liable to grow weedy, and perhaps damp off altogether. No plants seem to require more attention and care in English hot-houses, and in many collections they have been given up on account of constant failures. The same difficulty does not appear to attend their cultivation in India, possibly owing to the freer nature of the soil used, or the freer circulation of air they enjoy. Their most trying time is certainly the rains, and it is then that the advantage of a soil, less retentive of moisture than loam or peat, is apparent. Whenever a plant looks sickly, it is always best to examine its roots at once, carefully washing them clean, and potting in fresh soil; if rot has appeared in the rhizome, the infected part should be cut away, and the wounds powdered with sulphur to arrest the bleeding. In potting the growing points of the rhizome should always be placed a little above the level of the edges of the pot, to afford them as much air and light as possible. *Jennings*.

**A. albolineatus**, Par. & Rehb. f. see *A. brevilabris*.

1. **A. brevilabris**, Lindl. Gen. & Sp. 499.

Spur of lip saccate much shorter than the sepals, terminal lobes obtusely hatchet-shaped, claw of lip very short, fringes few.

Sikkim Himalaya (*Jc. Cathcart & J. D. H.*) Khasia Hills, alt. 4—5,000 ft., *Mack, &c.* Tenasserim, *Parish*.

*Leaves* ovate ; green with a white mesial band and golden nerves, red beneath. *Spike* 4—6 in., often very stout ; sepals and petals green tinged with pink ; lip white ; column very large with a forcipate appendage projecting from the base. *Hook. f. Fl. Brit. Ind.* vi. 95—96.

SYN.—*A. albolineatus*, Par. and Rchb. f. in 'Trans. Linn. Soc. xxx. 141 ; C. P. 325.

*Dossinia marmorata*, Lindl. in Journ. Linn. Soc. i. 185 (not of Morren).

**A. Dawsonianus**, C. P. 172. see *Haemaria discolor*, Var. *Dawsoniana*.

## 2. *A. regalis*, Blume Orchid. Archip. Ind. 46, t. 17 D.

Spur as long as the sepals, terminal lobes of the lip short quadrate much shorter than the claw.

Ceylon ; ascending to 3,000 ft.

*Stem* 6—10 in. *Leaves* 1—1½ in., ovate-cordate, acute, usually dark velvety green and netted with golden nerves. *Scape* stout or slender, sheaths 2 ; spike 3—5-fl'd. ; bracts lanceolate ; sepals ⅓ in. long, ovate, subacute, green ; petals broadly falcate, white ; fimbriæ of white lip as long as the claw, spur inflated, tip subacute notched ; column with 2 vertical lamellæ in front. Without an examination of the living plants it is impossible to say whether Blume is correct in separating the Ceylon plant from the original Javanese *A. setaceus*, *Hook. f. Fl. Brit. Ind.* vi. 95.

Long grown under the name of *A. setaceum*, which does not belong to it, the true *A. setaceum* of Blume having leaves of a velvety green without the golden veins conspicuous in this plant. *Williams*.

It is this *A. setaceus* which is figured by Parish, who also mentions *Monochilus regius* (? *A. regalis*), a Ceylon plant, possibly to be found in Burma, and he distinguishes *A. setaceus*, which he says is found in its forests. *B. G.*

SYN.—*A. setaceus*, Lindl. in Bot. Reg. 2010 ; Gen. and Sp. 499 ; Bot. Mag. t. 5208 ; Fl. des Serres, ii. t. 15 ; C. P. 379.

*Satyrium repens*, Linn. Sp. Pl. 1339.

## KEY TO SPECIES.

ANÆCTOCHILUS, \* Blume.

Terrestrial herbs, stem below creeping. *Leaves* petioled, ovate or lanceolate. *Flowers* in glandular-pubescent spikes. *Sepals* free, dorsal smaller and forming a hood with the narrow acuminate petals, lateral spreading. *Lip* adnate to the base of the column, contracted into an entire toothed or pectinate claw beyond the saccate spurred base, and having two, rarely four, terminal wing-like lobes, spur exserted beyond the bases of the sepals, and with 2 calli within. *Column* short, appendaged in front, stigmatic lobes lateral, anther 2-celled; pollinia narrowed into short or long caudicles.

\* *Claw of lip deeply fimbriate.*

No. 1, *A. brevilabris*; No. 2, *A. regalis*.

\*\* *Claw of lip entire or nearly so.*

No Burmese species.

## PHYSURUS, † Richard.

Terrestrial, leafy herbs; stem below creeping; roots fibrous. *Leaves* petioled, membranous, ovate or lanceolate. *Flowers* small spicate. *Sepals* free, dorsal smaller forming a hood with the petals. *Lip* erect from the base of the column, spreading or recurved; spur exserted beyond the bases of the sepals. *Column* very short, not appendaged in front, rostellum 2-fid; stigma anticus, prominent; anther erect, 2-celled; pollinia 2, clavate Hook f.

1. *P. hirsutus*, Lindl. in Journ. Linn. Soc. i. 180.

Tall, stout, villously hirsute, leaves ovate acuminate 7-nerved subglaucous beneath, base acute.

Assam, on the Burmese frontier, *Griffith*.

*Stem* as thick as a goose quill. *Leaves* 4—5 in., oblique. *Sepals, petals and lip* brownish, blade of the latter white.

\* See Appendix A, Genus 80.

† See Appendix A, Genus 79.

A very imperfectly known plant, of which there are no specimens in Griffith's Herbarium at Kew. *Hook. f. Fl. Brit. Ind. vi. 94.*

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### **SATYRIUM, \* Swartz.**

Terrestrial leafy erect herbs, tubers undivided. *Leaves* broad or narrow. *Flowers* in dense spikes. *Sepals* and *petals* subsimilar, free, spreading or deflexed. *Lip* superior, sessile at the base of the column, erect, broad, hooded, 2-spurred or -saccate behind. *Column* erect, terete; stigma terminal, broad, concave, or forming with the rostellum a 2-lipped body; anther dorsal, cells subparallel; pollinia 2, caudicles recurved, glands large naked sometimes connate. *Hook. f.*

#### **1. *S. nepalense*, Don. Prodr. 26.**

? Burma; Shan States, alt. 4,000 ft., Manders.

*Stem* with spike 6—30 in., usually very stout, sheathed above. *Leaves* few, from oblong to linear-oblong, 4—10 by 2—4 in., rather fleshy, sessile, base sheathing. *Spike* 1—6 in., dense-flid.; bracts much larger than the flowers, oblong or lanceolate, erect, spreading or recurved; ovary turgid,  $\frac{1}{3}$  in. long; flowers from dark pink to white, fragrant; sepals linear-oblong, obtuse, spreading and recurved; petals rather narrower; lip superior, broadly oblong concave, strongly keeled on the back, spurs variable in length and stoutness, about as long as the ovary; column contracted and terete at the base; anther broad, cells turgid, tubes short, pollinia clavate, caudicles short, glands orbicular; stigma large concave. A very common and variable plant. The Burmese specimen has orbicular leaves at the very base of the stem. *Hook. f. Fl. Brit. Ind. vi. 168.*

Lindl. Gen. and Sp. 340; in Journ. Linn. Soc. iii. 44; Wight Ic. t. 929; Bot. Mag. t. 6625; Wall. Cat. 7025.

SYN.—*S. Perrottetianum*, A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 76, t. 53; Wight Ic. t. 1716.

*S. alliflorum*, A. Rich. l. c.; Wight Ic. t. 1717.

*S. pallidum*, A. Rich. l. c.

## C. ANTHERS TWO.

### Tribe VII. CYPRIPEDEÆ.

#### CYPRIPEDIUM, Linn.

The plants of this last tribe differ remarkably in their fertilizing apparatus from the rest of the Order. I shall confine my remarks, however, to one genus, *viz.*, *Cypripedium*, as I am wholly unacquainted with the other two or three genera which go to complete the tribe. We have no longer a lid-like or operculate anther here, as in our old familiar acquaintances *Dendrobium* and *Vanda*, nor an erect rigid anther opening by two slits as in *Hubenaria*, no more pollen-masses of the ordinary type, waxy or granular, free, or attached to stipes or gland, and always easily detached from the column; but something wholly different. As you look into the flower, all you will probably see is a large fleshy appendage to which you cannot give a name: you must open the flower and look behind this same appendage. Then all that is to be seen will be revealed. The structure is as follows:—Theoretically there are 3 anthers, though practically or apparently only 2. “The column is short, bearing 2 perfect anthers” (the 2 rounded bodies seen beneath) “one on each side of the rostellum or style; the dorsal anther (the only one in the other Orchideæ) is here usually reduced to a variously shaped barren *staminodium*” (the afore-mentioned strange appendage); “the rostellum or style is more or less prominent or elongated between the lateral anthers, and dilated at the end into a more or less oblique stigma. *Bentham*.

The genus is not confined to tropical regions, but extends into the colder temperate parts of the world, being found in the latter in Europe

and America. The species found in the latter are terrestrial, those in the former mostly epiphytal.

It is a feature of *Cypripedium* to have the 2 lower sepals connate. *Parish.*

Many of the species have beautiful foliage as well as flowers, and on this account are worth a place in every collection. The form of the flower is curious, the usually conspicuous parts being the dorsal sepal, erect and highly coloured, 2 spreading often elongated petals, and a slipper-formed pouch or lip, on account of which latter the genus is generally called "Our Lady's Slipper." The tropical kinds are almost all dwarf, compact, and evergreen, the leaves of some being beautifully chequered. They produce their flowers from the centre of the leaf tufts, on an upright scape (one or two flowers) and rise from six inches to a foot or more. They all require a liberal quantity of water during their period of growth; and as they need but little rest, they never should be allowed to get too dry at the roots. The *Cypripediums*, unlike many orchids, have no thick fleshy bulbs to supply them with nourishment, and hence require a constant artificial supply. They are propagated by dividing the plants. *Williams.*

The word *Cypripedium* means "Slipper of Venus," who was sometimes called Cypris. *Jennings.*

### 1. *C. Bellatulum*. Rchb. f.

A superb species, closely allied to *C. Godefroyæ*, with large and broad oblong leaves, which are some 9—10 in. long, ground colour very dark green, tessellated and marbled with light green on the upper side wholly vinous-red beneath, flowers large and massive, dorsal sepal orbicular, incurved at the top, white, in some forms creamy-yellow, and in others flushed with rose, and in all cases heavily spotted with dull purple; inferior sepal large, similarly marked; petals very large and broad, oval, similarly marked to the dorsal sepal but the spots are larger and more distinct; pouch somewhat small, compressed, and tapering to a point, white dotted with purple; it is a very free grower, thus differing from all the other kinds belonging to this section; flowers during the summer months. *Williams.*

Burma; Rangoon Agri-Hort. Soc. Collectors. *B. G.*

*Lindenia* iv. t. 149; Journ. of Hort. 1888, xvi. 443, fig. 60; Veitch Man. Orch. Pl. iv. 15; Rev. Hortic. 1889, 201, fig. 53; Gard. Chron. 3rd. Sec. 1888, iii. 747, fig. 99; Id. 1890, vii. 556, fig. 89.

Var. *luteo-purpureum*, O'Brien in Gard. Chron. 3rd Sec. 1893, xiv. p. 179.

The entire ground colour is pale apricot-yellow. The sepals and petals have fewer purple markings than the ordinary form, and the blotches are irregular in shape and often run into each other; they are also confined to the inner two-thirds of each segment nearest to the column. The exterior of the labellum is unspotted, but the interior and the unfolded side lobes have purple dots. *J. O'Brien.*

**C. Boxallii**, Rchb. f. see *C. Villosum* Var. *Boxallii*. .

**2. Charlesworthii.** Rolfe.

A beautiful and striking novelty. In the habit of growth it resembles *C. Spicerianum* (*non-Burman*, *B. G.*), the broad dorsal sepal is flat,  $2\frac{1}{2}$  in. wide, white, veined with light rosy-purple; lower sepal about 1 in. broad, greenish-white; petals  $1\frac{1}{2}$  in long, yellowish tinged with brown; pouch not unlike that of *C. insigne* (*non-Burman*, *B. G.*), also yellow tinged with brown; the prominent staminode is pure white, with a spur in the centre. *Williams.*

Shan States, alt. 5,000 ft. *R. Moore.*

**3. C. Concolor**, Batem. in Bot. Mag. t. 5,513.

A very distinctly marked plant of the stemless section. The leaves are leathery, oblong-obtuse, beautifully variegated above and reddish purple beneath. The scape is short, pubescent, purple, usually 2-flowered; the flowers are cream-coloured and finely speckled with minute crimson dots, the sepals and petals are broad, and the lip comparatively small. Moulmein. *Williams.*

A dwarf terrestrial species. Leaves 5 or 6, or more ovate, blunt, beautifully mottled above with 2 shades of green, purple underneath, 4 to 5 inches long. Flowerstalk short, purple, 2-flowered; with a

large bract at the base of the germ. Flowers large, yellow, speckled with small red dots, 2 inches or more across. Upper sepal very broad nearly round. Lower sepal very similar but not quite so broad. Petals broad, oblong, blunt. Lip, as in the genus generally, saccate with the edges turned in.

Of the 2 excellent figures of this plant, one in Bot. Mag. 5513, and the other in L'illust. Hort. 1865. t. 444, I give the preference to the latter, as in it the markings on the leaves are more carefully shewn and are truer to nature. It grows abundantly in large patches in the hollow of the limestone rocks which form so striking a feature in the scenery round Moulmein. These hollows are commonly filled with light black and well drained vegetable mould.

*C. Concolor* affects such soil as does *Limatodis rosea*. I discovered it in such a place at *The Three Pagodas* in the year 1858. There is a similar species from the Straits with pure white flowers, *C. niveum*, which, although the flowers are not so large, is, in my opinion, a more elegant plant. Tenasserim, near Moulmein, *Parish*.

Par. in Gard. Chron. 1865. p. 626 ; 1883, i. 19, fig. 3, back fig. Bot. Mag. 5513 ; L'illust. Hort. 1856. tab. 444 (very good) ; C. P. 57 ; Batem. 2nd. Cent. Orch. Pl. t. 153 ; Fl. des Serres, t. 2321 ; Florist and Pomologist, 1870, 149, with fig. Williams Orchid. Alb. t. 302 ; Veitch Man. iv. 17, with fig. ; Fl. Brit. Ind. vi. 170.

Var. *Chlorophyllum*, Rchb. f.

A form in which the colour of the leaves is paler, and the purple is almost absent, being pale green ; the flowers are also characterized by a row of purple spots along the middle of the sepals and petals. *Williams*.

Var. *Striatum*, O'Brien.

This variety differs in having narrower petals than the type, but especially in both sepals and petals having a purple median line, with three or four smaller lines on each side. *Williams*.

Var. *Sulphurinum*, Rchb. f.

This is stated to be green-leaved. It is a lovely elegant variety with light sulphur-colored flowers, without the slightest trace of a spot ;



there are only two darker yellow eyes on the disk of the triangular heart-shaped, very acute, staminode; the petals are bent down with much elegance. *H. G. Reichenbach* in *Gard. Chron.* 1888, iv. 264.

**4. *C. hirsutissimum*, Lindl.** in *Bot. Mag.* t. 4990.

Leaves lorate acute, not tessellate, bract small and flower hirsute, dorsal sepal erect orbicular-ovate obtuse, petals horizontal spathulate, claw crisped or undulate, lip helmet-shaped, staminode quadrate angles rounded.

*Leaves* 9—12 in., green. *Scape* 12 in., green, hairs of bracts and flowers dark purple; flowers 4 in. diam.; dorsal sepal green with a dull purplish spotted disk; petals nearly as broad as the dorsal sepal, violet-purple, the lower half with green sides and midrib and copious dark spots, and hairs; lip green flushed with dark purple, minutely warted, mouth green within; staminode green, base white. *Hook. f.* *Fl. Brit. Ind.* vi. 171.

The blossoms, which often measure 6 in. across, open in March, April and May, and last six weeks. *Williams.*

Khasia Hills; on the Assam face, *Simons.* Northern India; Burma and the Malay Islands, *Jennings.*

*Warn. Sel. Orchid.* i. t. 15; *Belg. Hortic.* vii. 353, t. 61; *Ill. Hort.* iv. Misc. 67; *Xen. Orchid.* ii. 107, t. 132; *Rev. Hortic.* 1859, 182; *Fl. des Serres*, t. 1430; *Vetch Man.* 29, with fig.; *Batcm.* 2nd. Cent. Orchid. Pl. t. 149; *Journ. of Hort.* 1887, xiv. 293, f. 52.

**5. *C. Parishii*, Rchb. f.** in *Flora*, 1869, 322; in *Gard. Chron.* 1869, 814.

A very distinct and noble looking plant. The leaves are distichous, broadly loriform, leathery, the apex obliquely-obtuse, dark green above paler below. The flower-spike bearing from 3—6 large flowers, is stout, often 2 ft. high and hairy. The flowers have ovate pale green and greenish straw-coloured sepals, and drooping twisted petals from 4—5 inches long, green with margined purple hairy warts at the base, the upper  $\frac{2}{3}$  rds. deep purple, with an obtuse ciliate apex; lip green stained with purple. *Moulmein, Williams.*

An epiphyte. Stem and leaves together a foot or even 18 inches high, the latter 2 inches broad, dark green above, lighter underneath, linear and cleft at the end. Scape 18 inches to 2 ft. high, villous, 4—5-flowered. Bracts, large, green; sepals pale green, striped, broad, ovate, pointed, 2 in. long. Petals long, narrow, 4—5 in. and twisted, pendulous, much expanded, upper portion green, lower dark purple with a green margin. The edges are waved and crisped, with here and there warty protuberances with a pencil of hairs. Lip sometimes green but oftener when of robust growth of a dark purple tinge. First found in 1858 on the Shan border S. E. of Moulmein, but not there abundant; more so, apparently, northwards. *Parish.*

Williams Orchid. Alb. ii. t. 86; Da Puydt. Orch. 188; Bot. Mag. 5791. Orchidoph. 1887, t. 91; Ill. Hort. 1875, t. 214; Gard. Chron. 1869, 814; Veitch. Man. 41; Fl. Brit. Ind. vi. 174. C. P. 198.

SYN.—*Selenipedium Parishii*, Rev. Hort. 1885, 132.

#### 6. *C. Sallierii*, Godefroy, Les Cyrip. part i.

This is said to be a cross between *C. Villosum* and *C. insigne*, but we have seen a plant which had been imported from Burma, and which proved to be exactly like this plant; moreover, we learn that Mr. Sallier disclaims any knowledge of this being a hybrid. It is a bold growing plant somewhat between *C. insigne* and *Villosum*, and it produces a large and showy flower. Dorsal sepal pale green, the upper portion white, this is continued in a broad border almost to the base, similar to *C. insigne*; it is in addition striped with dark green and spotted with brown; inferior sepal small, pale green; petals brownish in the upper half, and greenish-yellow in the lower portion, with a dark brownish-purple streak in the centre, having the varnished appearance peculiar to *C. Villosum*, pouch large, brown, suffused with yellow; the foliage reminds one also of that species. Blooms during winter and spring months. Burma. *Williams.*

Var. *Aurea*, Hort.

This variety is much superior to the type. The dorsal sepal is yellow at the base, margined with white, and spotted at the lower part

petals and lip being almost pure yellow. Flowers in autumn. *Williams*.  
Fig. *Lindenla*. ii. t. 84. (*C. Sallierii*).

SYN.—*C. Sallierii hycanum*.

**7. *C. Villosum*, Lindl. in Gard. Chron. 1854, 125.**

An epiphyte, and a larger plant than *C. Concolor*. Leaves numerous, about 1 ft. long by 2 inches broad, linear, flaccid, pointed, dark green, the lower ones stained with purple underneath. Scape 6—8 in. high, villous, as is the germ, and all the exterior parts of the flower. Flowers 3—4 inches across, green outside, dark chocolate inside. Dorsal sepal spatulate, *i.e.*, expanding upwards from a narrower base, arched, concave. The lateral sepals obovate with a tapering base. The lip, which is of the usual form, is the same colour as the other parts of the flower, but of a much lighter shade. A very handsome species, growing in large tufts on trees. Found on "Dauna-toung," east of Moufmein, but scarce. Abundant on the mountains of Toung-ngoo about 4,000—5,000 ft. elevation. *Parish*.

A desirable species of the acaulescent group. The leaves are light green speckled over the lower exterior part with dark spots. The scapes are villous, about 1 ft. high, producing solitary flowers, often measuring 5 inches across and having a fine glossy appearance over their whole surface, which is orange red intermixed with light green and dark purple the dorsal sepal being green. It flowers during January and February and continues from 6 to 8 weeks in perfection. *Williams*.

Moulmein and Toungoo Mountains. *Williams*.

Warner Sel. Orch. Pl. ii. t. 30; Pescatorea, t. 48; Fl. des. Serres. t. 1475; Ill. Hort. t. 126; Florist and Pom. 1870, 211, with fig.; Id. 1882, 35, with fig.; Garden. iii. 415, with fig.; *Lindenla*, iii. t. 132; Veitch Man. iv. p. 55, with fig.; Fl. Brit. Ind. vi. 171; Gard. Chron. 3rd. Ser. 1890, viii. 688, f. 133; Garden 1891, xxxix, 568. t. 810; C. P. 92.

Var. *Boxallii*. Hook. f.

Burma, *Williams*.

A very distinct and welcome addition to the large group of acaulescent species. In growth it resembles *C. Villosum*, as well as in the

shape of its flowers. The leaves are broadly ligulate, deep green ; the dorsal sepal is greenish, broadly margined with white and heavily spotted with blackish purple nearly to the top ; the petals are yellowish-green marked with reddish-brown veins : the lip is also yellowish-green lightly tinged with dull purple. It flowers in January and February. The whole of the flower has a peculiar glazed appearance as in *C. villosum*. Burma. *Williams*.

SYN.—*C. Boxallii*, Rchb. f. in Gard. Chron. 1887, i. 367 ; Ill. Hort. xxvi. 345.

Sub-Var. *Boxallii atratum*, Rchb. f.

In this form the flowers are larger than in the type, and more brightly coloured, whilst the blackish or blackish-purple spots on the dorsal sepal are larger and more intense, nearly covering the central area, the whole being margined with white. *Williams*.

Rev. Hort. Belge, 1882, p. 97 ; Gard. Chron. 3rd. Ser. 1887, i. p. 218, f. 47 ; Reichenbachia 2nd. Ser. i. t. 8.

Sub-Var. *Boxallii aurea*, Gard. Chron. 1883, i. 374.

Has a bright yellow-green dorsal sepal margined with white and golden yellow petals and lip. *Hook. f. l. c.*

Sub-Var. *Boxallii nigrescens*, Hort.

The dorsal sepal is so profusely marbled and spotted with black that there is hardly any other colour discernable ; petals also very dark in colour. *Williams*.

Sub-Var. *Boxallii roseo-marginatum*, Desbois.

In this variety the dorsal sepal is richly marbled with shining black, broadly margined with white tinted with rose. *Williams*.

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## KEY TO SPECIES.

CYPRIPEDIUM, \* Linn.

Terrestrial herbs, with a leafy stem, plaited leaves and terminal

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\* See Appendix A, Genus III.

flowers, or stemless with distichous radical coriaceous often tessellately coloured leaves and 1-∞-fld. scapes. *Flowers* large, solitary or few. *Sepals* spreading, free, or the lateral connate and placed under the lip. *Petals* free, very various. *Lip* sessile, side lobes small, spreading or inflexed, midlobe very large saccate, inflated oblong or helmet-shaped. *Column* short, terete; anthers 2, globose, together with the disciform deflexed stigma hidden under a large disciform staminode; ovary 1-celled.

\* Leaves 2, opposite on the stem, plicate.

No Burmese species.

\* \* Leaves several, alternate, plaited.

No Burmese species.

\* \* \* Leaves radical, distichous, oblong or lorate, coriaceous, not plaited. Scape 1—3-fld., pubescent or villous.

a. *Petals as broad as the dorsal sepal, short, sessile, broadly oblong margins not undulate nor warted.*

No. 1, *C. Bellatulum*; No. 3, *C. concolor*.

b. *Petals as broad as the dorsal sepal or nearly so, spatulate, clawed, margins not warted.*

No. 4, *C. hirsutissimum*; No. 6, *C. Sallierii*; No. 7, *C. villosum*.

c. *Petals narrower but not much longer than the dorsal sepal, sometimes warted on the surface, but not on the margins, which are glabrous.*

No. 2, *C. Charlesworthii*.

d. *Petals narrower than the dorsal sepal, very long in C. Parishii, margins bearded or hirsute and warted.*

No. 5, *C. Parishii*.

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### APOSTASIA, \* Blume.

Terrestrial herbs, with a short caudex and leafy rigid stems.

*Leaves* narrow, strongly nerved. *Flowers* small, in terminal or

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\* See Appendix A, Genus 112.

axillary simple or paniced often decurved or deflexed spikes. *Sepals, petals* and *lip* all equal and alike, free spreading or recurved. *Ovary* very slender, 3-celled. *Column* short; anthers 2, at the sides of the rostellum, shortly stipitate, narrow, erect, 2-celled, cells parallel; staminode erect, behind the stigma, or O; stigma terminal long erect, tip discoid. Hook. f.

1. **A. nuda**, Br. in Wall. Cat. 4449; in Pl. As. Rar. i. 76, t. 85. Leaves narrowly linear-lanceolate finely acuminate 3—5-nerved, spikes paniced many-bracteate at the base, anthers erect, cell-bases equal, staminode O.

Tenasserim; at Mergui (*Griffith Kew Distrib.* 5604).

*Stem* 10—12 in. *Leaves* 4—10 in. *Panicle* decurved, much shorter than in *A. Wallichii* (non-Burman), as are the ovaries (*i.e.*, than 4—10 in. and  $\frac{1}{2}$ — $\frac{3}{4}$  in. respectively). *Hook. f.* Fl. Brit. Ind. vi. 175.

Blumé in Ann. Sc. Nat. Ser. 2, ii. 93; Miquel Fl. Ind. Bat. iii. 748; Rolfe in Journ. Linn. Soc. xxv. 239, t. 48, f. 20, 21.

SYN.—*A. Brunonis*, Griff. Notul. iii. 243; Ic. Pl. Asiat. t. 282.

*A. odorata*, Wall. Pl. As. Rar. l. c.

❖ FINIS. ❖

## APPENDIX A.

The following is Sir Joseph Hooker's classification of the order, taken from his *Flora of British India*, vols. v. and vi., and is a key to the Tribes, Subtribes, Genera and Sections of Genera. The further subdivision of the Sections is given in the Key to Species following each Genus described in the body of the work, which should be read in conjunction with this Appendix. *B. G.*

## ORDER CXLVIII. ORCHIDÆ.

Herbs of various habit, rarely shrubby, of two principal forms : I, terrestrial, tuberous-rooted herbs, with annual herbaceous simple stems and solitary or spicate or racemose flowers : II, epiphytes with perennial stems or branches variously thickened and forming a pseudobulb, flowering from the top sides or base of the pseudobulb. *Perianth* superior, irregular, of 6 free or variously combined pieces ; 3 outer (sepals) more or less alike, the 2 lateral sometimes united into a short or long sac or spur-like base (*mentum*) ; 3 inner (petals) dissimilar, the two lateral alike, the other (*lip*) usually very differently shaped. *Stamens* and *style* united in a column opposite the lip, anther (except in *Cypripediæ*) solitary on the front or top or back of the column and free or adnate to it, 2-celled or by subdivisions 4-celled ; top of the column sometimes produced in front (towards the lip) into a beak (*rostellum*) ; pollen-grains usually cohering in each cell into 1, 2, or 4 pairs of oblong globose or pyriform waxy or powdery masses (*pollinia*) which are free or attached by pairs or fours to a viscus or gland, or a stalk (*caudicle*) that terminates in a gland and by which the pollen mass or masses may be removed entire. *Ovary* inferior, 1-celled (3-celled in *Apostasia*), usually linear and twisted ; stigma a viscid surface on the top or concave face of the column, opposite the lip and below the anther (in *Cypripedium* the anthers are 2, on each side of the base of a short style with a discoid stigma). *Seeds* minute, testa lax enclosing a homogeneous nucleus. Genera 340, species about 5,000, temperate and tropical, rarely arctic.

## Tribe I. EPIDENDRÆÆ.

*Anther* I, opercular, usually deciduous, cells parallel, distinct. *Pollinia* waxy, 1—4 in each cell, free, or those of each cell held together at the base by a viscid appendage, not attached by their bases or by a caudicle to the rostellum. (*Tipularia* has caudicled pollinia, and in *Calanthe* and other *Celogyneæ* the long bases of the pollinia resemble caudicles.)

.Subtribe 1. **MALAXEÆ\*** (and LIPARIDÆÆ Gen. Pl.).

Stems simple, leafy, rarely leafless, with often a pseudobulbous base. Inflorescence terminal. Flowers small or minute. Anther erect or inclined, usually persistent, accumbent or incumbent. Pollinia 4 (or 8), close together, usually free (without a viscid appendage).

Genus 1. **Oberonia**. Epiphytic, Leaves distichous, fleshy, laterally compressed, nerveless. Flowers very minute, in cylindric spikes or racemes; column very short.

Section I. OBERONIA PROPER. *Stem* very short, rarely 2—4 in. *Leaves* ensiform, chiefly radical or subradical. *Sepals* subequal.

Section II. SCYLLA. *Stem* short or 0. *Leaves* ensiform. *Sepals* very unequal, dorsal lanceolate, lateral very much larger, orbicular.

Section III. MYOSURUS. *Leaves* all radical, elongate, terete, fleshy.

\* I have departed from Bentham in including *Lipariææ* and *Malaxææ* under one sub-order. The essential character of *Lipariææ*, the incumbent anther, fails in a great measure when *Oberonia* is placed in it, for the pollinia of this genus are as Griffith points out (Notul. iii. 273) in *O. anthropophora* and *trilobata* (*ensiformis*, Lindl.) at first accumbent; and in these and others he describes them as "accumbenti-incumbentia." Added to this the habit of *Microstylis* which is placed in *Malaxææ*, is that of *Liparis*; and of *Oberonia*, which is placed in *Lipariææ* is that of *Malaxis*. The clindandrium is so minute in *Oberonia* and *Microstylis* that I have little confidence in my own results obtained by softening these parts in dried specimens, but my impression is that in *Microstylis* the anther will be found to be both accumbent and incumbent, very much as in *Oberonia*. Lastly, the pollinia of *Oberonia* are variously described as 2 or 4. I think that 4 is the rule, but one of each pair is often much smaller, and I suspect sometimes suppressed.



Section IV. CAULESCENTES. *Stem* elongate, with many equitant short cultriform leaves.

Genus 2. **Microstylis**. Terrestrial. Leaves membranous, base sheathing. Flowers small. Column very short.

Genus 3. **Liparis**. Terrestrial or epiphytic. Leaves membranous or coriaceous, base sheathing. Flowers small or medium sized. Column long.

Section I. MOLLIFOLIÆ. *Leaves* membranous, not jointed at the base on their sheath or pseudobulb, usually broad, often petioled.

Section II. CORIIFOLIÆ. *Leaves* jointed at the base upon the leaf sheath or on a pseudobulb, usually coriaceous.

Section III. DISTICHÆ. Bracts of the short flat raceme distichous and imbricating, coriaceous, ensiform.

Genus 4. **Platyclinis**. Non-Burman.

Genus 5. **Tipularia**. Non-Burman.

Genus 6. **Oreorchis**. Non-Burman.

Genus 7. **Corallorhiza**. Non-Burman.

#### Subtribe II. DENDROBIEÆ.

Inflorescence terminal, lateral, or on a leafless scape, Pollinia 4, rarely 2, 1-seriate, parallel, appendage O.

\* *Inflorescence lateral on a leafy or leafless stem, or terminal, or from the top of a 1—2-leaved pseudobulb.*

Genus 8. **Dendrobium**. Lip adnate to the produced foot of the column, contracted at the base or clawed, base erect and incumbent on the column, not mobile.

SERIES I. Inflorescence terminal (that is, from the base of a terminal arrested internode), or both terminal and lateral. (See also some species of sect. *Aporum*; lateral in *Formosa*.)

Section I. SARCOPODIUM. *Pseudobulbs* short, erect, uninodal, seated singly on a stout creeping rhizome. *Leaves* 2, terminal, opposite,

coriaceous, flat, persistent. *Flowers* solitary from between the leaves or on a 1—few-fld, scape, large or medium-sized; mentum short, rounded. Habit of *Bulbophyllum*, sect. *Sestochilus*.

Section II. BOLBODIUM. *Pseudobulbs* erect, as in *Sarcopodium*, but more tufted, clavate and stipitate. *Leaves* 2, terminal, opposite, coriaceous, flat persistent. *Flowers* solitary or few from between the leaves, medium-sized, white; mentum large, longer than the lateral sepals, conical, incurved.

Section III. CADETIA. *Stem* branched, pendulous, branches forming chains of uninodal sessile or stipitate pseudobulbs. *Leaf* solitary, terminal, coriaceous, flat, persistent. *Flowers* 1—2 from the base of the leaf, medium-sized, white or pale; mentum short or elongate.

Section IV. STACHYBIUM. *Stems* tufted, forming a small poly-nodal pseudobulb, or more or less elongate, often compressed, simple or branched. *Leaves* many, narrow, membranous, deciduous, or persistent. *Flowers* solitary, or in slender terminal or terminal and lateral racemes, small or medium-sized, often white; mentum rather long, conical, incurved, or short and obtuse; lip with often a flat keel on the disk that terminates in a truncate crenate callus on the midlobe. Small species of this section resemble *Eria*, sect. *Bryobium*.

Section V. FORMOSÆ. *Stems* rather short, tufted, leafy, usually suberect, often with deciduous black hairs on the sheaths. *Flowers* solitary or racemose, often large, white, or pale buff with faint colouring on the lip; mentum usually long and funnel-shaped, or conical, acute, straight or incurved (short in *D. albo-sanguineum*); midlobe of lip often fimbriate on the margin or disk. Similarly hairy sheaths occur in Sect. *Virgatæ* and in *D. nutans* and a few others.

SERIES II. Inflorescence lateral on the stem or pseudobulb (terminal in some species of *Aporum*.)

Section VI. APORUM. *Stems* tufted, compressed, leafy. *Leaves* shortly ensiform distichous, sheaths equitant imbricating, fleshy or coriaceous, nerveless, persistent. *Flowers* small, white or yellowish with pink markings, shortly pedicelled, solitary or in bracteate heads or

short racemes, sometimes appearing racemose from occupying the leafless ends of the branches ; mentum stout, as long as or longer than the short broad lateral sepals.

Section VII. **STRONGYLE.** *Stems* tufted, slender, often branched, terete. *Leaves* terete, subterete or subulate, persistent. *Flowers* small, white or pale, solitary or as if racemed on the leafless ends of the stem or branches ; mentum as in *Aporum*. This section is not very well distinguished from the preceding and following.

Section VIII. **VIRGATÆ.** *Stems* tufted, elongate, slender, but hard, rigid and polished, simple or branched, leafy, often swollen at the base. *Leaves* distichous, long, linear (shorter and oblong in *D. tubiferum* and *crumenatum*), persistent. *Flowers* small or medium-sized, white or yellow with often pink or green markings, solitary or few on a leaf-opposed tubercle, or appearing racemed on the leafless ends of the stem or branches, sheaths sometimes pubescent with black hairs ; mentum usually long, stout, incurved ; petals and lip often very narrow.

Section IX. **BREVIFLORES.** *Stems* tufted, long or short, terete or clavate, sparingly leafy. *Leaves* oblong or lanceolate, persistent or deciduous. *Flowers* few, small, in short racemes or heads, pink or yellow, often dingy ; mentum large, saccate ; lip very short, deeply concave or urceolate, truncate or lobes short.

Section X. **PEDILONIUM.** *Stems* tufted, long, terete, simple, stout or slender, erect or pendulous, leafy. *Leaves* distichous, oblong or lanceolate, coriaceous or submembranous, persistent or deciduous. *Flowers* medium-sized, pink or yellow, rarely white, in short leaf-opposed often dense-fld, secund racemes, or in corymbs or tufts, rarely solitary ; mentum stout and often very long, equalling or longer (often much) than the short triangular sepals ; lip usually very long and narrow, clawed, with often a small lamella, callus or spur on the claw near the base. *D. sanguinolentum* is perhaps better referred to Sect. XII.

Section XI. **DISTICHOPHYLLÆ.** *Stems* tufted, elongate, stout or slender, leafy throughout. *Leaves* short, uniform, distichous, bases im-

bricating, persistent, emarginate or 2-fid. *Flowers* small, usually white or yellow, solitary or in short leaf-opposed racemes; mentum stout, spur-like, as long as the lateral sepals or longer; lip short, broad, sides recurved. Habit of *Appendicula*.

Section XII. EUDENDROBIUM. *Stems* tufted, elongate, stout or slender, clavate or nodose in some species. *Leaves* various, distichous (terminal and solitary in *D. aggregatum* only), membranous or coriaceous, persistent or deciduous. *Flowers* usually large in lateral pairs, fascicles or racemes, very rarely solitary, highly coloured or white. This section is best characterized by wanting the sum of the characters of any of the others. The species with narrow sepals, petals and a long mentum approach *Formosæ* and *Pedilonium*.

\* \* *Inflorescence distinct from the pseudobulb.*

Genus 9. **Bulbophyllum**. Racemes or spikes elongate, rarely 1-fid. or umbelliform. Sepals usually subequal, free. Lip jointed on the foot of the column and mobile.

\* Section I. EPICRIANTHES. *Rhizome* creeping, pseudobulbous. *Flowers* solitary, axillary, very shortly pedicelled. *Petals* represented by 6—7 elongate narrowly strap-shaped stipitate pendulous mobile threads. *Epicrianthes*, *Blume*.

Section II. OXYSEPALA. *Stems* many from a rooting base, densely tufted, very slender, pendulous, much branched, clothed with scarious silvery sheaths; pseudobulbs few, minute ovoid. *Flowers* very small, solitary or 2-nate on a very short scape which is concealed by the sheaths; bracts cymbiform. *Sepals* very slender connivent.

Section III. EUBULBOPHYLLUM. *Rhizome* creeping, bearing distant or approximate pseudobulbs (sometimes very small or O). *Inflorescence* various. *Lip* usually strongly recurved and much shorter than the sepals. The divisions under this section are in great measure artificial.

Section IV. IONE. *Lateral sepals* usually connate and placed under the lip. *Lip* rather large, straight, rigid. *Pollinia* 4, attached in pairs to two cartilaginous glands.

Genus 9/1. **Henosis**. Petals forming a minute broad low wing

on each side of the enormous 2-winged column, along the naked foot of which they extend as a membranous boarder to the insertion of the lateral sepals, perfectly hyaline, and appressed to the sides of the very base of the column, low and very broad.

Genus 10. **Sunipia**. Characters of *Bulbophyllum*, but anther turned away from the rostellum and dehiscing upwards. Flower spicate, coriaceous, concealed by the concave bracts.

Genus 11. **Cirrhopetalum**. Flowers umbellate. Lateral sepals longer than the dorsal, placed under the mobile lip or connate.

Genus 12. **Trias**. Scape 1-fl. Sepals spreading equally. Anther produced into a long appendage. Very small herbs, pseudobulbs 1-leaved.

Genus 13. **Drymoda**. Scape 1-fl. Lateral sepals far removed from the dorsal. Pollinia connate in pairs. Pseudobulb small, 1-leaved; leaf caducous.

Genus 14. **Monomeria**. Raceme long, lax-fl.; flowers large. Lateral sepals broad, far removed from the dorsal. Pseudobulb 1-leaved; leaf narrow, petioled, coriaceous. • •

Genus 15. **Dendrochilum**. Flowers small, racemose. Sepals equal, spreading. Pseudobulb O, or on a rigid creeping stem; leaf narrow.

Genus 16. **Panisia**. Scape slender, few-fl. Sepals subequal. Lip very narrow, with a long sigmoid claw. Pollinia 4, distinct. Pseudobulb narrow, crowded, 1-leaved.

Genus 17. **Acrochæne**. Non-Burman.

Genus 18. **Chrysoglossum**. Non-Burman.

Genus 18/2. **Collabium**. Non-Burman.

### Subtribe III. **ERIEÆ**.

Inflorescence lateral, or on a leafless scape. Pollinia 8, subequal, appendage O or obscure.

Genus 19. **Eria**.<sup>\*</sup> Peduncles 1- many-fl'd., axillary or subterminal on a leafy stem or on a pseudobulb. Column short, produced into a foot. Habit very various.

Section I. **PORPAX**, *Lindl.* (Gen.). Small species. *Pseudobulbs* depressed, clothed with reticulated sheaths, 2-leaved. *Leaves* sessile, membranous, caducous. *Flowers* 1—3, subsessile on the top of the pseudobulb; sepals free or connate; column very short.

Section II. **CONCHIDIUM**, *Griff.* (Gen.). Small species. *Pseudobulbs* naked or sheathed, and leaves as in *Porpax*. *Flowers* solitary or few, on a slender scape from the top of the pseudobulb.

Section III. **BRYOBIUM**, *Lindl.* (Gen.). Small species. *Pseudobulbs* ovoid or depressed, 2—3-leaved. *Leaves* membranous. *Scape* from between the leaves, filiform. *Flowers* racemose, small glabrous.

Section IV. **ERIURA**, *Lindl.* *Stem* tall (rarely short), terete, leafy. *Leaves* distichous, long, narrow. *Flowers* minute, woolly, in subterminal spikes racemes or fascicles; lateral sepals short broad; column very short.

Section V. **MYCARANTHES**, *Blume* (Gen.). *Pseudobulbs* on a creeping rhizome elongate cylindric or clavate, naked. *Leaves* 2—3 terminal narrow. *Flowers* minute, woolly, in second spikes from the side of the pseudobulb or from between the leaves.

Section VI. **HYMENERIA**, *Lindl.* (and *Urostachya Lindl.*). *Pseudobulbs* short or long 1-  $\infty$ -noded, often forming a fleshy stem or crowded on the creeping rhizome. *Flowers* small or medium-sized, glabrous or pubescent, rarely woolly, in lateral or subterminal spikes or racemes.

Section VII. **DENDROLIRION**, *Lindl.* *Stems* or *pseudobulbs* very various. *Leaves* one or few, terminal or subterminal on the pseudobulbs, or on a creeping rhizome. *Flowers* in terminal or subterminal spikes or racemes, or subsolitary on the rhizome, woolly or densely tomentose.

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\* The inflorescence is often subterminal in *Eria*, and appears to be truly terminal in the anomalous genus 19/1 *Claderia*.

Section VIII. **BAMBUSIFOLIA**, *Hook. f.* *Stem* tall, terete, leafy. *Leaves* distichous, elliptic or lanceolate, glabrous. *Flowers* in leaf-opposed racemes, glabrous or tomentose.

Section IX. **TRICHOTOSIA**, *Blume* (Gen.). *Stems* usually long, terete, leafy (short and creeping in *E. sedifolia*), often hirsute. *Leaves* narrow, distichous. *Flowers* in leaf-opposed clusters, spikes or racemes, more or less hirsute; lip usually very narrow and stiff; mentum short.

Section X. **XIPHOSIUM**. *Pseudobulb* uninodal, 1-leaved. *Scape* from the base of the pseudobulb, clothed below with equitant sheaths, the uppermost ensiform. *Flower* rather large; sepals keeled; ovary and pedicel tripterous.

Section XI. **ACRIDOSTACHYA**, *Hook. f.* *Pseudobulb* very short, sheathed as in *Xiphosium*. *Scape* from the base of the pseudobulb, stout, erect. *Flowers* minute, in dense rusty-tomentose spikes; sepals very short; mentum long, spur-like.

Section XII. **DILOCHIPSIS**, *Hook. f.* *Stems* tufted, tall, erect, leafy. *Leaves* distichous, ensiform. *Flowers* in a short terminal branched panicle with large deciduous rigid bracts.

Section XIII. **PELLAIANTHUS**, *Hook. f.* *Stems* terete short, erect from a creeping rhizome. *Leaves* 2, terminal. *Spike* short, lateral; perianth very thick; column with a very short foot or O.

Genus 19/1. **Claderia**. Non-Burman.

Genus 20. **Phreatia**. Peduncle lateral or from a leafless root-stock, flowers minute. Column very short, produced into a foot. Stem short, leaves distichous.

Genus 21. **Pachystoma**. Non-Burman.

Genus 21/1. **Ipsea**. Non-Burman.

Genus 22. **Spathoglottis**. *Scape* distinct from the 1—2-leaved pseudobulb. Sepals spreading. Column elongate, foot O. Capsule erect or nodding. Leaves elongate, plicate.

Subtribe 4. **BLETIEÆ.**

Inflorescence usually lateral. Pollinia 8, except in *Anthogonium*, usually in 2 series, parallel, ascending, connected by a granular appendage.

Genus 23. **Acanthephippium.** Non-Burman.

Genus 24. **Phaius.** Flowers large, racemose. Sepals free. Lip gibbous or spurred, lateral lobes embracing the long column, which is not prolonged into a foot. Leaves often large, plaited.

Genus 25. **Nephelaphyllum.** Non-Burman.

Genus 26. **Tainia.** Flowers racemose on a leafless scape. Sepals and petals acute, caudate; lateral sepals inserted on the short foot of the column. Lip spurred or gibbous. Pseudobulbs thick, 1-leaved.

Genus 27. **Anthogonium.** Flowers racemose on a leafless scape. Sepals connate in a slender tube. Petals linear, claws free within the sepals. Column elongate, foot 0. Pollinia 4 (upper series wanting). Leaves few, grass-like, from a pseudobulb.

Subtribe 5. **CŒLOGYNEÆ.**

Inflorescence terminal. Pollinia 8 or 4, subequal, connected by a viscus or an appendage (in *Calanthe* and others the pollinia are appendaged, but the appendage is an undeveloped portion of the pollen itself, and is not derived from the rostellum).

\* *Pseudobulb 0. Peduncle elongate branched. Flowers small.*

Genus 28. **Josephia.** Non-Burman.

\*\* *Flowers capitate. Lateral sepals forming a mentum with the foot of the column.*

Genus 29. **Glomera.** *Cancel this genus.*

Genus 30. **Agrostophyllum.** Stem leafy. Flowers in a dense head. Pollinia 8.

Genus 31. **Ceratostylis.** Non-Burman.

\*\*\* *Flowers spicate or racemose. Lateral sepals united in a mentum.*



Genus 32. **Cryptochilus.** Non-Burman.

Genus 33. **Trichosma.** Non-Burman.

\* \* \* \* *Flowers solitary, spicate or racemose. Sepals free. Column without a foot.*

Genus 34. **Cœlogyne.** Pseudobulbs distinct, 2-leaved. Lip sessile, its base embracing the elongate column. Pollinia 4. Flowers racemose, often large.

Section I. EUCŒLOGYNE. *Flowers and leaves coætaneous. Lip 3-lobed, the terminal lobe spreading.*

Section II. PLEIONE. *Flowers appearing before or after the leaves (except C. Hookeriana) from the base of the mature pseudobulb. Lip large, convolute, with shovel-shaped mouth, very obscurely 3-lobed.*

Genus 35. **Otochilus.** Pseudobulbs superposed, uppermost 2-leaved. Lip sessile, base saccate, lateral lobes ear-like. Column elongate; pollinia 4. Peduncle terminal, sheathed.

Genus 36. **Pholidota.** Pseudobulbs 2-leaved, solitary or superposed. Lip saccate. Column short, broadly 2-winged; pollinia 4. Peduncle sheathed.

Genus 37. **Calanthe.** Terrestrial herbs. Leaves plicate, produced after the racemose flowers. Lip usually spurred, claw connate into a tube with the column.

Section I. *Lip at the top of the short stout column opposite to the stigmatic cavity.*

Section II. *Lip inserted at the base of the column, which is not embraced by its side lobes. Bracts very long, slender, caducous. Scape always shorter than the leaves.*

Section III. *Lip inserted at the top of the broad short column, its side lobes convolute and embracing the column.*

Genus 38. **Arundina.** Terrestrial herbs; stem leafy. Sepals spreading. Lip sessile, not spurred, base concave embracing the column.

Section I. EUARUNDINA. *Raceme* simple or sparingly branched; bracts small, broadly ovate, acute persistent. *Lip* very variable but always large, oblong, broad, subentire, or with obscure side lobes, a small crisped terminal lobe and 2 or more lamellate nerves at the base.

Section II. DILOCHIA. *Raceme* or *panicle* branched. *Bracts* large deciduous. *Anthers* 3.

## Tribe II. VANDEÆ.

*Anther* 1, posticous, opercular, resting on the rostellum, cells usually confluent. *Pollinia* waxy, usually 2 or 4 in superposed pairs, attached singly or in pairs to a gland or process of the rostellum which is carried away with them when they are removed.

### Subtribe I. EULOPHIÆ.\*

Terrestrial, never epiphytic. Stem rarely pseudobulbous. Lip usually spurred, saccate or forming with the lateral sepals a mentum.

Genus 39. **Eulophia**. Lip free from the sides of the column, adnate to its base or foot. Scape usually leafless. Petals like the dorsal sepal (this character is subject to many exceptions). Lip gibbous or saccate, rarely spurred. Gland of the rostellum usually produced into a stipes.

Section I. EULOPHIA proper. *Column* not produced into a foot.

Section II. CYRTOPERA. *Column* produced into a foot.

\* The subtribe Cyrtopodiæ of Bentham is here included as far as the Indian genera are concerned in Eulophiæ. *Eulophiæ* are described in the "Genera" as pseudobulbous, and having a spurred lip, but very few indeed of the Indian species are pseudobulbous, many have a mere sac to represent the spur, in many the so-called spur is a true mentum, and Bolus "Orchids of Cape Peninsula" describes species that have neither a spurred nor saccate lip. The only character given for *Cyrtopodiæ*, as distinctive from *Eulophiæ*, is that of the column being produced into a foot; but this is invalidated by my having to follow Blume, Bolus, and others in replacing *Cyrtopera*, which in the "Genera" is referred to *Cyrtopodium*, in *Eulophia*; and as I find no character by which *Plocoglottis*, the only other Indian genus of Bentham's *Cyrtopodia*, can be excluded *Eulophiæ*, I propose—the character given above.

Genus 48. **Plocoglottis**. Non-Burman.

Subtribe II. **CYMBIDIEÆ**.

Terrestrial or epiphytic. Lip neither spurred nor conspicuously saccate; adnate to the base of the column.

Genus 40. **Cymbidium**. Sepals and petals subequal, spreading. Lobes of the lip embracing the unwinged column. Pollinia with a transverse granular appendage. Leafy stems short, pseudobulbous.

Genus 41. **Cyperorchis**. Lip erect from the base, narrow; lateral lobes embracing the column. Stem short, leafy. Scape sheathed, leafless.

Genus 41/1. **Cremastra**. Non-Burman.

Genus 42. **Geodorum**. Sepals and petals erecto-patent, subequal. Lip sessile, broad from the base, ventricose, erect, almost complicate. Stem short, leafy, and leafless scapes arising from a stout subtuberous rootstock.

Genus 43. **Grammatophyllum**. Sepals and petals spreading. Pollinia after removal attached to the lobes or horns of a lunate or curved stipes. Stem leafy; scape many-fl., leafless.

Genus 44. **Dipodium**. Non-Burman.

Genus 45. **Thecostele**. Sepals and petals spreading. Lip adnate to the base of the column, united at the base with it into a short tube, then spreading. Column sigmoid. Pseudobulb 1-leaved. Scape leafless, lateral, recurved.

Genus 46. **Bromheadia**. Sepals and petals spreading. Lip erect; lateral lobes embracing the 2-winged column. Pseudobulb 0; flowering-stem with distichous leaves; peduncle terminal, sometimes branched, rachis of raceme often thickened serrate by the distichous bracts.

Genus 47. **Polystachya**. Non-Burman.

Subtribe III. **SARCANTHEÆ.** \*

Stem without pseudobulbs, rooting. Leaves distichous (rarely O), not plaited. Peduncle lateral or axillary.

\* *Lip not spurred (see Arachnanthe). Column without a foot, short, not winged.*

Genus 49. **Luisia.**† Sepals and petals not spreading widely. Lip not jointed at the base, usually longer than the sepals. Stipes of the pollinia ovate, flat. Leaves terete; flowers in short spikes.

Genus 50. **Cottonia.** Non-Burman.

Genus 50/1. **Diploprora.** Sepals and broader petals spreading. Lip with sides adnate to the sides of the column, cymbiform, with a compressed bicaudate tip. Stipes of pollinia short, narrow. Raceme very shortly peduncled.

Genus 51. **Stauroopsis.** Sepals and petals spreading widely. Lip not jointed at the base. Stipes of pollinia long, narrow. Flowers medium-sized, in simple or branched racemes.

Genus 52. **Arachnanthe.** Sepals and petals widely spreading. Lip jointed at the base, gibbous or shortly spurred. Stipes of the pollinia flat, acute from a broad base. Flowers large, loosely racemed.

\* \* *Lateral sepals adnate to the foot of the column, forming a mentum. Spur, if present, distant from the base of the lip, sometimes recurved and ascending.*

Genus 53. **Phalænopsis.** Lip spreading from the base or erect at the base, not spurred, disk with a forked callus or plate. Column erect, foot short, or long or O. Stipes of the pollinia linear or spatulate. Flowers large, in simple or branched racemes.

\* The classification of the genera of this subtribe presents great difficulties. In so far as the Indian genera are concerned I have not been able to improve upon Bentham's arrangement; though I find numerous exceptions to the characters given under the three subdivisions marked by stars.

† The *Cristaria* section of *Vanda* unites that genus with this. The incurved sepals and petals of sect. *Cristaria* are those of *Luisia*, but the foliage and habit are those of most *Vanda*. The lip of one species of Sect. *Cristaria* is spurred or saccate as in *Vanda*, of another it is flat as in *Luisia*, without spur or sac.

Genus 54. **Doritis**. Lip with a long claw, incumbent, 3-lobed not spurred. Column winged, foot long. Flowers small or medium-sized, in simple or branched racemes. The foot of the column forms a conical mentum with the lateral sepals.

Genus 55. **Rhynchostylis**.<sup>\*</sup> Lip saccate at its union with the foot of the column, then narrowed, blade ovate or tongue-shaped. Column wingless, foot short. Stipes of the pollinia subfiliform. Flowers rather large, in long dense racemes.

Genus 56. **Sarcophilus**.<sup>†</sup> Lip shortly incumbent or adnate to the base of the column, blade fleshy, top often inflexed, gibbous or shortly stoutly spurred. Stipes of the pollinia linear or oblong. Flowers usually small, in simple racemes.

**A.** Flowers loosely inserted all round the rachis of a more or less elongated raceme or spike.

<sup>\*</sup> *Lateral sepals inserted by a narrow base to the base of the column, or base of the column and sides of the lip. Foot of column 0 or very short.*

Section I. **PTEROCERAS**, *Hasselt*. (Gen.). Lip shortly clawed. Column short; rostellum minute.

Section II. **STEREOCHILUS**, *Lindl.* (Gen.). Lip sessile or subsessile. Column long; rostellum very long, slender.

Section III. Lip long clawed. Column short; rostellum very short.

Section IV. **MICROPERA**, *Lindl.* (Gen.). Stem elongate, scandent. Lip sessile. Column short; rostellum very long; strap of globose pollinia very slender, gland minute.

<sup>\*\*</sup> *Lateral sepals inserted by a very broad base to the elongate foot of the column.*

<sup>\*</sup> Placed by Bentham in a division of *Sarcantheæ* with a foot to the column and a mentum, but appears to me to have these characters very obscurely if at all. The lip and spur are exactly those of *Saccolabium*.

<sup>†</sup> Inconstant as regards the presence or absence of a foot to the column, and in having a mentum or spur or neither. It is a truly polymorphous genus, incapable of precise definition.

Section V. *CHILOSCHISTA*, *Lindl.* (Gen.) Leafless when flowering.  
*Stem* O. Side lobes of *lip* large, erect, midlobe a tomentose pulvinus.

Section VI. LEAFING and flowering together. *Lip* various.

**B.** Flowers in very short spikes at the apex of a slender scape, bracts persistent, imbricate.

Section VII. *FORNICARIA*, *Benth.*

**C.** Flowers distichous on a compressed rachis, which is pectinate from the uniform persistent laterally compressed fleshy bracts.

Section VIII. *CUCULLA*, *Benth.* *Peduncles* stout, solitary. *Lip* stipitate, articulate with the foot of the column.

Section IX. *RIDLEYA*, Gen. ? *Peduncles*, filiform, fascicled. *Lip* sessile.

Genus 57. **Trichoglottis**. *Lip* with a long foot adnate to the base of the column. Flowers few, small.

Genus 58. **Ærides**.\* *Lip* jointed on to the long foot of the column, blade with an ascending or recurved hollow spur. Stipes of the pollinia narrow. Flowers in simple or branched racemes.

Section I. *Leaves* terete, grooved in front. (See also *Æ. mitratum*). *Peduncle* 1—2-fl. *Spur* slightly incurved with a callus half way down the tube. *Anther* shortly beaked.

Section II. *Leaves* lorate, keeled (semi-terete in *Æ. mitratum*); side lobes of *lip* very small, midlobe large; spur incurved.

Section III. *Leaves* lorate, keeled. Midlobe of *lip* incurved between the much larger side lobes.

\* \* \*. *Lip* saccate or spurred at the base (not under the blade).  
*Column* wingless.

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\* I do not find the lip to be truly articulate with the foot of the column as described in "Gen. Plant." The species of the first section with terete leaves closely approach the terete leaved *Vanda*, and those of Section II. \* \* resemble *Saccolabia*. The stipes of the pollinia is sometimes short and broad.

Genus 59. **Renanthera**. Sepals and petals spreading widely ; lateral sepals usually the largest, parallel and placed under the small lip. Stipes of pollinia flat, narrow. Racemes branched.

Genus 60. **Vanda**.\* Sepals and petals fleshy, widely spreading from a narrow base. Stipes of pollinia broad. Flowers large, in simple racemes.

Section I. **EUVANDA**. *Sepals and petals* widely spreading (not incurved). *Lip* with erect side lobes. *Strap* of pollinia flat, geniculate, gland large.

Section II. **ANOTA**, *Lindl.* *Raceme* dense-fl'd. *Sepals and petals* widely spreading. *Lip* without side lobes. *Strap of pollinia* long, slender, straight.

Section III. **CRISTATÆ**. *Racemes* shortly peduncled, few-fl'd. ; pedicels decurved. *Sepals and petals* incurved. *Strap of pollinia* very short, gland large. Inflorescence and flowers of *Luisia*, but habit and foliage of *Vanda*.

Genus 61. **Saccolabium**. † Sepals and petals widely spreading. Column without appendages. Stipes of pollinia usually slender. Flowers small, in simple or branched racemes. Spur without a callus *under the column* within, or a septum.

Section I. **MICRANTHÆ**. *Leaves* flat terete or channelled. *Flowers* small, often minute, in simple or paniced racemes or spikes. *Lip* various ; spur long or short. (See also sect. vi. *Uncifera*.)

Section II. **CALCEOLARIA**. *Leaves* lorate, flat, flaccid. *Flowers* subcorymbose on a short stout peduncle ; bracts short, broad, rounded. *Lip* a large hemispheric sac, with truncate or short side lobes and a short triangular or reniform adnate erose or fimbriate midlobe which is warted or echinate on the disk. *Column* very short ; strap of globose pollinia linear.

\* See notes under 49 *Luisia* and 58 *Ærides* for remarks. The Sect. *Anota* (*V. densiflora*) has so short a foot to the column that it might well be placed in *Saccolabium*. The stipes of the pollinia varies greatly in length and breadth.

† The sepals and petals are often incurved.

Section III. ACAMPE. *Stem* usually long and very stout. *Leaves* keeled, thickly coriaceous. *Flowers* corymbose as in sect. *Calceolaria*, rarely in large spreading panicles. *Lip* as in sect. *Calceolaria*, but with thicker warty reniform or ovate midlobe (spur cylindric as in *S. ochraceum*). *Column* very short; strap of globose pollinia linear. (*Acampe*, Lindl.)

Section IV. PLATYRHIZON. *Stem* 0, or very short; roots very long, flattened. *Leaves* lorate, flaccid. *Flowers* racemed. *Lip* very small, spur saccate or conical, midlobe small reniform. *Column* very short; strap of globose pollinia linear, gland large. (*Micropera* Dalz.).

Section V. DISTICHOPHYLLÆ. *Stem* tufted, very slender pendulous, leafy throughout. *Leaves* uniform, distichous, lanceolate. *Flowers* small, in very short racemes. *Lip* small, spur saccate. *Column* very short, strap of pollinia slender, gland sagittate.

Section VI. SPECIOSÆ. *Stem* very stout as are the long roots. *Leaves* linear rigid, keeled, often recurved. *Flowers* highly coloured, in dense racemes. *Lip* with a linguiform midlobe, small side lobes and a long cylindric spur. *Column* short or rather long; strap of globose pollinia slender. Habit of *Ærides* sect. II.; but there is no foot to the column.

Section VII. UNCIFERÆ. *Stem* very short. *Leaves* distichous, coriaceous. *Flowers* in dense racemes. *Lip* with a large funnel-shaped incurved spur much longer than the sepals. *Column* decurved, rostellum elongate; anther long-beaked; pollinia globose, seated near the geniculately inflexed apex of a very long slender strap with recurved margins; gland large, linear, or sagittate. (*Uncifera*, Lindl.)

Genus 62. **Schoenorchis**. *Cancelled*. Non-British-Indian.

Genera 63. *Uncifera*, and 64 *Acampe*, are included under SACCOLABIUM. (See remarks under the latter genus, Key to Species, in body of work.)



Genus 65. **Sarcanthus**.\* Sepals and petals fleshy, spreading. Spur of the lip internally divided longitudinally. Flowers small, in simple or paniced slender racemes.

Genus 66. **Cleisostoma**.\* Spur of the lip almost closed with a callus or lamella. Flowers small, crowded or in simple or branched racemes.

Genus 67. **Ornithochilus**.\* Sepals spreading; lateral connate at the base of the claw of the lip, and together with it forming a mentum. Lip broadly 2—3-lobed, often fimbriate. Stipes of the pollinia strap-shaped. Flowers small, in simple or branched slender racemes.

Genus 68. **Tæniophyllum**. Non-Burman.

Genus 69. **Microsaccus**. Sepals and petals spreading. Pollinia 4, distinct; Stipes linear. Small herbs with many small distichous leaves, and 1—2 minute flowers.

Genus 70. **Diplocentrum**. Non-Burman.

#### Subtribe 4. **NOTYLIEÆ**.

Stem with a 1-leaved pseudobulb, or slender. Leaves small, distichous. Anther behind and parallel to the terminal erect or inclined, rarely horizontal rostellum. Pollinia with a simple or double stipes, pendulous from the tip of the rostellum.

Genus 71. **Acriopsis**. Sepals narrow, spreading; lateral connate. Petals broader. Claw of lip connate with the column, and forming a broad pitcher. Top of column hooded, membranous. Pollinia 2 or 4, stipes simple. Pseudobulbs with 1—2 narrow leaves. Flowers small, in simple or branched slender lax racemes.

Genus 72. **Podochilus**. Sepals erect. Lip jointed on to the foot of the column. Stipes of the 4 pollinia 2. Leaves small, distichous; pseudobulb O. Flowers small, in a terminal raceme.

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65, *Sarcanthus* and 66, *Cleisostoma*, are separated from *Saccolabium* and from one another by characters so minute and trivial, that they might well rank as sections of that genus, to which 57, *Ornithochilus* might be added.

Genus 73. **Appendicula**. Sepals erect. Lip continuous with the foot of the column, not jointed. Leaves distichous; pseudobulbs O. Flowers small, in lateral or subterminal racemes.

Genus 74. **Thelasis**. Sepals erect. Lip erect, undivided. Column without a foot. Stipes of pollinia simple. Herbs with 1-leaved pseudobulbs, or leaves distichous as in *Oberonia*. Flowers minute, in terminal racemes.

### Tribe III. NEOTTIEÆ.

*Stem* not bulbous (roots often bulbous). *Anther* 1, posticous, opercular, or erect and persistent; cells distinct, parallel. Pollen granular, powdery or in small masses.

#### Subtribe 1. VANILLEÆ.\*

Stem tall, erect or climbing, often branched. Racemes or panicles terminal ♂ terminal and axillary. Anther subopercular, incumbent on a short rostellum.

Genus 75. **Galeola**. Climbers. Leaves O or on flowerless branches. Sepals spreading or broadly concave. Lip broad, concave, loosely investing the column.

Genus 76. **Vanilla**. Climbers. Leaves O or coriaceous. Claw of the lip adnate to the column; limb broad, concave, embracing the column.

#### Subtribe 2. CORYMBEÆ.†

Stem tall, sometimes branched. Leaves broad. Racemes or panicles terminal. Anther erect, parallel to the erect rostellum.

Genus 77. **Corymbis**. Sepals and petals narrow, cohering in a tube. Lip linear. Column elongate. Flowers loosely paniced.

Genus 78. **Tropidia**. Lateral sepals connate, forming a mentum. Lip sessile. Column short. Spikes short, dense-fld.

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\* The free often hippocrepiform pollinia, without caudicle or gland, distinguish the Indian species from *Corymbæ* and *Spirantheæ*.

† Differs from all other Indian *Neottieæ* in the hard, almost woody, stem and rigid leaves, in which respect the species resemble *Apostasia*.

Section I. CNEMIDIA. *Lip* spurred. *Spike* terminal peduncled.

Section II. TROPIDIA PROPER. *Lip* cymbiform, not spurred.

### Subtribe 3. **Spirantheæ.**

Stem simple erect ; root not tuberous. Leaves membranous or O. Anther erect or inclined forward, parallel to the elongate rostellum.

\* Spur or sac of the lip exposed beyond the base of the lateral sepals. (See also a few species of *Goodyera*).

Genus 79. **Physurus**. ? Non-Burman. (*P. hirsutus*, Lindl. Ássam, on the Burmese frontier, *Griffith*.)

Genus 80. **Anæctochilus**. Lip clawed beyond the spur, limb 2-winged ; spur 2-glandular within ; column appendaged in front ; stigmatic lobes lateral.

Genus 81. **Vrydagzynea**. Non-Burman.

Genus 82. **Cystorchis**. Non-Burman.

Genus 83. **Herpsyma**. Non-Burman.

\* \* Lip if spurred, with the spur or sac covered by the bases of the lateral sepals (except in a few *Goodyera*).

† *Lip* clawed beyond the spur or sac.

Genus 84. **Odontochilus**. Non-Burman.

Genus 85. **Hæmaria**. Sepals free ; lip adnate to the base and sides of the column, claw winged, limb 2-winged ; sac 2-glandular within ; column large, clavate ; stigma anticus.

Genus 90. **Cheirostylis**. Sepals connate to the middle in a tube ; lip with a saccate or cymbiform base and 2-lobed toothed or pectinate limb, sac 2-or multi-glandular within ; columnar appendages long, fleshy ; stigmatic lobes lateral.

Genus 91. **Zeuxiffe**. Sepals free ; lip with a cymbiform or saccate base, a short broad entire toothed or crenate claw, and broadly dilate limb ; sac two glandular within ; column with 2 linear appendages in front ; stigmatic lobes lateral,

Section I. EUZEUXINE, *Lindl.* *Leaves* sessile, linear-lanceolate.

Section II. MONOCHILUS, *Wall.* (Gen.). *Leaves* ovate. All scapigerous.

† † *Lip saccate or spurred, not clawed beyond the sac or spur.*

Genus 92. **Hylophyla.** Non-Burman.

Genus 93. **Goodyera.** Lip cymbiform or subsaccate, naked or setose within ; column not appendaged in front ; stigma anticus.

Genus 94. **Heteraria.** Sepals free at the base or connate, lip adnate to the sides of the column, limb entire or 2-lobed ; sac 2-glandular or setose within ; column winged or not in front ; stigmatic lobes lateral.

† † † *Lip flat, neither clawed, spurred, nor saccate (subsaccate in *Spiranthes*, and see also some *Goodyerae*).*

Genus 86. **Dossinia.** Cancelled ; non-British-Indian.

Genus 87. **Spiranthis.** Non-Burman.

Genus 88. **Neottia.** Non-Burman.

Genus 89. **Listeria.** Non-Burman.

#### Subtribe 4. **DIURIDEÆ.**

Stem simple, erect from an underground tuber. Anther erect or inclined forward ; rostellum usually short.

Genus 95. **Aphyllorchis.** Non-Burman.

Genus 96. **Cryptostylis.** Non-Burman.

Genus 97. **Corysanthes.** Non-Burman.

#### Subtribe 5. **ARETHUSEÆ.**

Stem simple, erect from an underground tuber. Anther opercular, incumbent, or suberect.

Genus 98. **Pogonia.** Sepals erect or spreading. Lip undivided or 3-lobed. Column elongate, not winged. Flowering-stem leafy or leafless with the leaf produced afterwards.

Genus 99. **Didymoplexis.** Non-Burman.

Genus 100. **Gastrodia.** Non-Burman.

Genus 100/1. **Yoania.** Non-Burman

Genus 101. **Epipogum.** Non-Burman.

Subtribe 6. **LIMODOREÆ.**

Stem simple, usually leafy, erect from an underground rootstock.  
Anther opercular, incumbent or suberect.

Genus 102. **Cephalanthera.** Non-Burman.

Genus 103. **Epipactis.** Non-Burman.

Tribe IV. OPHRYDEÆ.

*Anther* 1, posticous, erect, inclined or reflexed. *Cells* parallel or diverging, adnate to the column and often continuous with the rostellum.  
*Pollinia* 1, rarely 2 in each cell, granular, produced into long or short caudicles attached to a gland or to the rostellum. Terrestrial herbs.

Subtribe 1. **EUOPHRYDEÆ \* (SERAPIEÆ.)**

Anther erect. Pollinia with their glands enclosed in a pouch of the rostellum.

Genus 104. **Orchis.** Non-Burman.

Subtribe 2. **HABENARIEÆ.**

Anther erect. Pollinia with their glands naked or partially included in a groove or fold of the rostellum.

Genus 105. **Herminium.** † Lip not spurred. Low small-fl. herbs.

Genus 106. **Habenaria.** Lip spurred. Sepals equalling or exceeding the petals. Flowers spicate or racemose. Rostellum not clongate.

**A.** *Lateral sepals spreading deflexed or reflexed.*

\* If I am correct in my analyses of the rostellum in some of the smaller *Habenarie* it may prove difficult to separate this subtribe from *Habenariceæ*. Under any circumstances the modifications of the rostellum are so great in both that I doubt its forming a subtribal character.

† The *Herminia* will with a saccate base of the lip differ in no way from *Habenaria*.

Section I. ATE. *Petals* truncate 2-fid, or 2-partite. *Lip* 3-lobed or -partite.

Section II. PLATYGLOSSA. *Petals* entire. *Lip* 3-lobed or partite, side lobes broad (narrow in *H. platyphylla*) petaloid, midlobe narrow.

Section III. TRIMEROGLOSSA. *Petals* entire. *Lip* 3-partite, side lobes very narrow, entire, usually filiform (lip entire in *Peloria* forms of *H. Mandersii* and *reniformis*).

Section IV. HOLOGLOSSA. *Petals* entire. *Lip* entire, linear.

**B.** *Lateral sepals erect, or ascending parallel to the dorsal and petals, or forming a hood with these, rarely at length spreading or deflexed.*

Section V. PERISTYLUS. *Petals* entire. *Lip* usually 3-fid, or 3-partite (entire in *H. breviloba*). *Flowers* usually very small, and *petals* broader than the lateral sepals and often fleshy; spur rarely exceeding the ovary, usually very short or saccate.

Section VI. PHYLLOSTACHYA. *Petals* entire. *Lip* broad, entire, petaloid; spur conico-infundibular. *Flowers* large, in the axils of sheathing leaves; stigmatic processes 0; rostellum obscure. (See also *H. triflora*).

#### ABERRANT SPECIES (OR GENERA ?) OF GROUP B.

Section VII. PLECTOGLOSSA. *Flowers* large, in the axils of imbricating leaves. *Lip* coriaceous, clawed, 3-fid, longitudinally 3-plicate in bud, spur long slender. *Stigmatic processes* large, rhomboid; rostellum broad, triangular.

Section VIII. DIPHYLAX. *Flowers* small, secund. *Lip* entire; spur short fusiform. *Anther* with a setiform staminode on each side as long as itself.

Section IX. DIPYLA. *Flowers* small, secund. *Lip* 3-fid. Spur inflated. *Pollinia* sessile on a single large obcordate gland, seated in a sinus of the broad 2-lobed rostellum. *Stigmatic processes* small.

Section X. DITHRIX. *Flowers* small, secund, tubular; sepals, petals and lip coherent at the base. *Lip* oblong, 3-fid, base saccate. *Staminodes* 2, filiform, capitate, inserted on the back of the anther.

*Stigma* a transverse cushion; rostellum a transverse plate below the anther.

Genus 107. **Diplomeris**. Non-Burman.

Genus 108. **Hemipilia**. Lip spurred. Sepals larger than the petals. Leaf radical, solitary; raceme few-fl. Rostellum very prominent.

### Subtribe 3. **DISEÆ**.

Anther reclinate or reflexed on the back of the column, rarely sub-erect. Stigma broad, subterminal or subadnate to the lip.

Genus 109. **Satyrium**. Lip erect, 2-spurred. Flowers spicate. (Doubtfully Burman.)

### Subtribe 4. **CORYCIEÆ**.

Genus 110. **Disperis**.\* Non-Burman.

### Tribe V. **CYPRIPEDIEÆ**.

Flowers very irregular. Lip inflated. *Anthers* 2, one on each side of a large dilated rostellum, sessile or stipitate. *Anther* posticous. *Staminode* very large. *Pollinia* granular. Terrestrial herbs.

Genus 111. **Cypripedium**. Sepals spreading. Lip inflated. Anthers 2. Ovary 1-celled. Flowers large.

Genus 112. **Apostasia**. Flowers regular. Sepals, petals and lip all similar. Anthers 2 or 3 on the sides of a small erect rostellum. *Staminode* very small or 0. Ovary 3-celled. Flowers small.

Genus 113. **Neuwiedia**. Non-Burman.

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\* This genus and *Satyrium* are the solitary Indian representatives of the extensive S. African subtribes *Diseæ* and *Coryciæ*, which are distinguished from one another by Bentham and more recently by Bolus (Orchids of the Cape Peninsula) by the former having the sepals and petals all free, and the lip at the base of the column, whilst in the latter the dorsal sepal and petals cohere, and the lip is adnate to the column nearly to its tip.

## APPENDIX B.

## AN INDEX OF TECHNICAL TERMS.

- ACAULESCENT**, ... stemless, or the stem inconspicuous.  
**Acerose**, ... narrow, stiff and prickly.  
**Acicular**, ... needle-shaped.  
**Acinaciform**, ... scimitar-shaped.  
**Acuminate**, ... the tip narrowing rapidly and lengthening into a point; long taper pointed.  
**Acute**, ... terminating in a sharp angle.  
**Adnate**, • ... growing or adhering to throughout its length.  
**Alternate**, ... *leaves* are given off singly from the nodes, and are placed alternately on different sides of the stem, one above the other.  
**Amethystine**, ... violet-blue colour.  
**Amorphous**, ... having no regular structure.  
**Amplexicaul**, ... enlarged at the base and clasping the stem.  
**Ampulliform**, ... bottle-shaped, or like an inflated bladder.  
**Androclinium**, ... *see Clinandrium*.  
**Annular**, ... like a ring.  
**Annulate**, ... formed or divided into rings.  
**Anther**, ... the cap or bag containing the pollen.  
**Anticous**, ... in front, turned towards the front of the flower.  
     Same as *introrse*.  
**Appendiculate**, ... provided with appendages; having the character of an appendage.  
**Apical**, • ... growing from or belonging to the apex.  
**Apiculate**,• ... terminated by a short point.  
**Apiculus**, ... a small point formed by the projection of the midrib beyond the leaf.  
**Apodous**, ... without a foot.  
**Arcuate**, ... curved in the form of a bow.



- Auricles, ... ear-like appendages.  
 Awn, ... a slender sharp process like the beard of chaff, or the glume in corn or grasses.  
 Axil, ... the angle formed by the union of the upper surface of a leaf with the stem.  
 Axillary, ... arising out of the axil.  
  
 Bi— ... in composition equals *doubly*.  
 Bicrenate, ... having the marginal crenatures themselves crenate.  
 Bicuspidate, ... two-pronged.  
 Bidentate, ... having the marginal teeth themselves toothed.  
 Bifarious, ... pointing two ways, or arranged in two opposite rows.  
 Bifid, ... divided into two parts by a fissure.  
 Bipartite, ... divided into two parts by a partition.  
 Bipinnatifid, ... doubly pinnatifid. *See page 13.*  
 Bipinnatipartite, ... doubly pinnatipartite. *See page 13.*  
 Bipinnatisected, ... doubly pinnatisected. *See page 13.*  
 Bisected, ... divided into two parts by a segment.  
 Biserrate, ... having the marginal serratures themselves serrate.  
 Bisetose, ... furnished with two bristle-like appendages.  
 Bract, ... a modified leaf, generally situated on the peduncle close below the flower.  
 Bracteole, ... a small bract situated on the pedicel in a many-fl. inflorescence.  
 Bullate, ... the blade much swollen between the nerves.  
  
 CADUCOUS, ... falling off early.  
 Calceolar, ... in the form of a slipper.  
 Callus, ... a callosity or indurated part.  
 Calyptra, ... a hood-like body connected with the organs of fructification.  
 Calyptiform, ... hood-like.  
 Campanulate, ... in the form of a bell.  
 Capitate, ... growing in a head.  
 Capillary, ... very slender and thread-like.  
 Capsule, ... a dehiscent seed-case.

- Carinate, ... shaped like the keel of a boat.  
 Carinulate, ... slightly carinate.  
 Caruncle, ... a soft fleshy excrescence.  
 Caudate, ... having a tail-like appendage.  
 Caudex, ... stem.  
 Caudicle, ... an elastic stalk supporting the pollen-mass, terminating in a gland.  
 Caudicula, ... see *Caudicle*.  
 Caulescent, ... having an obvious stem rising above the ground.  
 Cauline, ... belonging to the stem.  
 Cernuous, ... drooping, pendulous ; flowers placed on a curved peduncle, and so having the top curved downwards.  
 Channelled, ... grooved longitudinally.  
 Chartaceous, ... of a paper-like texture.  
 Ciliate, ... the margins bearing long hairs like eyelashes.  
 Cirrhiferous, ... bearing tendrils.  
 Clathrate, ... latticed ; divided like lattice-work.  
 Clavate, ... club shaped.  
 Clavellate, ... resembling little clubs or billets.  
 Claw, ... of a petal, the petiole by which it is attached when not sessile.  
 Clinandrium, ... the cavity at the apex of the column in orchids containing the anthers.  
 Cochleate, ... twisted like a snail's shell ; spiral.  
 Collateral, ... side by side.  
 Column, ... the united stamens and styles in orchids forming a solid central body.  
 Complicate, ... folded together.  
 Conchiform, ... shell-shaped.  
 Conchoid, ... a sort of spiral curve.  
 Conduplicate, ... one half folded over the other parallel with the axis.  
 Connate, ... grown together ; united in growth.  
 Connivent, ... bending towards one another.  
 Convolute, ... the lamina rolled up from a lateral margin into a single coil.

- Cordate, ... the base forming two rounded lobes and the tip pointed, somewhat like an ace of hearts.  
 Coriaceous, ... leathery ; tough.  
 Corm, ... an underground rhizome.  
 Corniform, ... horn-shaped.  
 Cornute, ... horn-shaped ; horned.  
 Corymb, ... an inflorescence resembling the raceme, but in which lower pedicels are so much longer than the upper, that the flowers are almost on a level.  
 Corymbose, ... relating to, or like a corymb.  
 Costa, ... the midrib of a leaf.  
 Crenate, ... the margin with rounded teeth and a sharp sinus.  
 Crenulate, ... finely crenate.  
 Crinite, ... resembling a tuft of hair.  
 Crisped, ... having a crimped margin.  
 Cristate, ... crested ; tufted.  
 Cucullate, ... hooded ; cowl-shaped.  
 Cultriform, ... shaped like a pruning-knife.  
 Cuncate, ... wedge-shaped : broad at the apex and tapering towards the base.  
 Cupular, ... cup-shaped.  
 Cusp ... a slender sharp point.  
 Cuspidate, ... terminating in a slender sharp point.  
 Cymbiform, ... boat-shaped.
- DECIDUOUS, ... falling off at a certain time or season.  
 Decomposed, ... see *laciniated*.  
 Decurved, ... curved downwards.  
 Defoliated, ... with the leaf fallen away.  
 Dehiscence, ... a splitting open ; as the opening of the parts of a capsule.  
 Dentate, ... toothed ; the teeth sharp with a rounded sinus, but not pointing in any particular direction.  
 Denticulate, ... finely dentate.  
 Depressed, ... having the centre portion lower than the sides.

- Dichotomous, ... dividing in pairs. The stem bearing opposite  
 • branches, which continually fork to the extremi-  
 ties of its branches.
- Didymous, ... twin ; growing double.
- Diffuse, ... spreading widely, horizontally and irregularly.
- Dilated, ... expanded ; enlarged.
- Dimidiate, ... halved ; and only one-half developed. Applied  
 to an organ when half of it is so much smaller  
 • than the other as to appear to be missing.
- Disciform, ... in the form of a disc.
- Disk, ... the central part of the lamina of the lip.
- Dissected, ... the lamina divided by numerous *Segments*.
- Distichous, ... placed alternately above and directly opposite to  
 each other on either side of the stem.
- Divaricating, ... a forking ; branching off at or almost at a right  
 angle.
- Dorsal, ... *sepal*, the uppermost.
- Duplicate, ... doubled ; folded.
- ECHINATE, ... set with prickles.
- Eciliate, ... not ciliate.
- Elliptic, ... having the two ends of the blade rounded and  
 equal, like an ellipse : 2—3 times as long as  
 broad.
- Emarginate, ... having the apex obtuse with a sharp or nearly  
 triangular notch ; terminating in a shallow sinus.
- Ensiform, ... sword-shaped.
- Entire, ... with the margin perfectly even, free from every  
 kind of irregularity.
- Epigeal, ... upon, or above, the earth.
- Epichile, ... the label or terminal portion of the strangulated  
 or articulated lip of orchids.
- Epiphyte, ... growing on other plants.
- Equitant, ... set edgewise.

- Erect, ... vertical.  
 Erecto-patent, ... spreading at an angle of about  $45^{\circ}$ .  
 Erosc, ... having small sinuses in the margin.  
 Everted, ... turned outwards, or inside out.  
 Excurrent, ... a projecting or running beyond the margin or point.  
 Exserted, ... protruding.  
  
 FALCATE, ... sickle-shaped.  
 Fascicle, ... a little bundle.  
 —fid, ... in composition, divided by fissures. *See page 12.*  
 Filiform, ... thread-like, but less fine than *capillary*.  
 Fimbriate, ... fringed ; the margin presenting long thread-like processes.  
 Fissure, ... a sinus descending about midway between the margin and the mesial line or base.  
 Flabellate, ... in the form of a fan.  
 Flabelliform, ... fan-shaped.  
 Flaccid, ... flabby.  
 Flexuous, ... bending ; curving.  
 Foliaceous, ... belonging to or having the texture or nature of a leaf ; having leaves intermixed with flowers, as a foliaceous spike.  
 Forcipate, ... formed like a pair of pincers.  
 Foveolate, ... marked with little depressions or pits.  
 Frustule, ... a piece ; a bit.  
 Fugaceous, ... fleeting.  
 Furfuraceous, ... scaly ; scurfy.  
 Fusiform, ... spindle-shaped.  
  
 GEMINATE, ... disposed in pairs.  
 Geniculate, ... knecd ; knee-jointed.  
 Genus, ... An assemblage of species possessing certain characters in common by which they are distinguished ; a class made up of two or more species.

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- Infundibular, ... having the form of a funnel.  
 Interfoliar, ... between opposite leaves, but placed alternately with them.  
 Internode, ... the part between two nodes.  
 Involute, ... rolled inwards from the edges.  
 LACERATE, ... having the edge variously cut into irregular segments.  
 Laciniaë, ... acute divisions separated by an acute sinus which reaches half way to the middle of the blade.  
 Laciniate, ... cut into an indefinite number of unequal laciniaë.  
 Lamellæ, ... thin plates or scales.  
 Lamellate, ... furnished with lamellæ.  
 Lamina, ... a thin plate. The blade of a leaf or petal.  
 Lanceolate, ... widest in the middle and tapering gradually towards the extremities; 3—4 times as long as broad.  
 Ligulate, ... like a strap.  
 Linear, ... having the sides of the blade nearly parallel, and the space between them narrow.  
 Linguiform, ... having the shape of a tongue.  
 Lip, ... the third petal of an Orchid which is usually turned towards the lower front of the flower, and different in shape from the others.  
 Lobe, ... a division of the lamina between 2 more or less rounded fissures.  
 Lobule, ... a small lobe.  
 Lobulate, ... consisting of lobules; having small lobed divisions.  
 Loculicidally, ... that mode of dehiscence which consists in the capsule splitting open through the back.  
 Lorate, ... shaped like a thong or strap.  
 Lunate, ... crescent-shaped; *reniform* but with the lobes at the base pointed.  
 Lyrate, ... lyre-shaped.  
 MEMBRANOUS, ... thin, flexible, and almost transparent.

- Mentum,** ... a chin ; the forward projection of the foot of the column in Orchids.  
**Mesial,** ... middle ; dividing into two equal parts.  
**Mitriform,** ... resembling a mitre ; conical, hollow, open at the base.  
**Moniliform,** ... like a string of beads.  
**Mucro,** ... a stiff sharp point.  
**Mucronate,** ... the apex, commonly rounded, ending abruptly in a short point.  
**Muricate,** ... full of sharp points or prickles.  
  
**NERVOSE,** ... much veined.  
**Nodate,** ... knotted ; knobbed.  
**Node,** ... the part of the stem from which a leaf springs.  
**Nodose,** ... having the nodes tumid.  
  
**OB,** ... *in composition*, inversely.  
**Obcordate,** ... having the apex broader than the base and hollowed out into two rounded lobes ; base more or less pointed.  
**Oblanceolate** ... inversely lanceolate.  
**Oblong,** ... with the width about  $\frac{1}{3}$  of the length, and obtuse or rounded at the extremities.  
**Obovate,** ... ovate, but with the smaller end at the base.  
**Obpyriform,** ... inversely pyriform.  
**Obturbinate,** ... inversely turbinate.  
**Obtuse,** ... with the tip rounded ; blunt.  
**Ocellated,** ... marked with ring-like spots.  
**Ochreous,** ... reddish or brownish yellow.  
**Opercular,** ... lid-like.  
**Orbicular,** ... having a circular circumference.  
**Oval,** ... see *elliptic*.  
**Ovary,** ... a hollow case inclosing ovules or young seeds, ultimately becoming the fruit.  
**Ovate,** ... resembling the longitudinal section of an egg, with the larger end at the base.



- Ovoid, ... resembling an egg in shape.
- PALEA, ... a chaff-like scale or bracteole in the axis of which is the flower.
- Panicle, ... a raceme in which the secondary axes are themselves branched.
- Panduriform, ... fiddle-shaped.
- Papillæ, ... sessile glands with one secreting cell, placed above the level of the epidermis.
- Papillose, ... having many papillæ.
- Partite, ... *partition in composition. See page 12.*
- Partition, ... a division when the sinuses extend nearly to the base of the blade.
- Patent, ... horizontal.
- Pectinate, ... toothed like a comb.
- Pedicel, ... a branch of the peduncle which directly bears the flower.
- Peduncle, ... the stock which bears the flower or flowers, either solitary or as the floral axis.
- Pelorian ... the appearance of regularity in the structure of the flowers which are normally irregular.
- Peltate ... fixed to the stalk by the centre.
- Perianth, ... the flower-envelope, *i.e.*, the parts surrounding the anthers.
- Persistent, ... not falling off before flowering.
- Petal, ... one of the three inner segments of the perianth or flower envelope, but in orchids usually applied only to the two upper, the lower one being called the "lip."
- Petiole, ... a leaf-stalk.
- Pilose, ... covered with long scattered hairs.
- Pinnatifid, }  
 " partite, } ... cleft like a feather, and according to the depth  
 " sected, } ... of the sinuses. *See page 13.*
- Plicate, ... folded like a fan.
- Plumose, ... a hair when covered with secondary hairs arranged as in a feather.

- Pollen, ... the dusty matter contained in the anther, usually in Orchids cohering in masses, called *pollinia*, of a waxy or granular nature, by a viscid substance.
- Pollinia, ... the pollen-masses with their appendages.
- Polymorphous, ... having many forms.
- Porrect, ... extending horizontally.
- Posticous, ... same as *extrorse*; having the anther with its face directed outwards, or turned away from the axis.
- Præmorse, ... terminating abruptly in a ragged and irregular line, as if bitten off.
- Procumbent, ... trailing along the ground.
- Proliferous, ... producing another from within itself, said of a flower; bearing or producing something abnormal or adventitious.
- Pseudobulb, ... a leaf-bearing stem which has assumed a swollen more or less rounded, oval, clavate, &c. shape.
- Pustulate, ... covered with glandular excrescences.
- Puberulous, ... covered with a fine down.
- Pubescent, ... covered with more or less appressed short thick hairs.
- Pulvinate, ... cushion-shaped.
- Pyriform, ... top-shaped.
- RACEME, .. that form of inflorescence in which the primary axis or peduncle is elongated and bears flowers placed on pedicels of nearly equal length.
- Racemose, ... bearing flowers in the form of a raceme.
- Rachis, ... a peduncle giving off from its sides sessile flowers, or branches bearing flowers; also called the *axis of the inflorescence*.
- Ramentaceous, ... covered with thin brown scales.
- Reclinate, ... bent back or downwards; falling gradually back from the perpendicular.
- Recurved, ... curved backward or outwards.
- Reflexed, ... bent back so as to expose the inner surface.

- Reniform, ... kidney-shaped ; resembles *cordate* but with the apex rounded.
- Repend, ... having an uneven, sinuous margin.
- Replicate, ... doubled back or down.
- Resupinate, ... inverted.
- Reticulate ... resembling network ; net-veined.
- Retorse, ... in a backward direction ; placed at the back of the flower.
- Retuse, ... blunt ; terminating in a rounded end, the centre of which is depressed.
- Revolute, ... rolled or curved back.
- Rhizome, ... a stem extending obliquely or horizontally, the advancing portion emitting roots, pseudobulbs, leaves or shoots, the posterior gradually dying.
- Rhombic, ... shaped somewhat like an oblique-angled equilateral parallelogram.
- Rhomboid, ... a figure approaching rhombic, and having the opposite sides and angles equal, but which is neither equilateral nor equiangular.
- Ringent, ... gaping.
- Rostellum, .. the top of the column produced in front (towards the lip) into a beak.
- Rosulate, ... having the leaves arranged in little rose-like clusters.
- Runcinate, ... pinnatifid, with the lobes convex before, and straight behind.
- Rugose, ... wrinkled.
- SACCATE, ... having the form of a bag.
- Sagittate, .. shaped like the head of an arrow ; triangular.
- Scabrid, ... the surface presenting little inequalities ; rough or harsh to the touch.
- Scale, ... a flattened, membranous, more or less rounded plate of tissue, attached by its centre.

- Scandent, ... climbing.  
 Scape, ... a leafless flower-stalk.  
 Scarious, ... dry and hard.  
 —sected, ... in composition, divided into segments. *See page 13.*  
 Sectile, ... capable of being separated into two or more parts.  
 Secund, ... unilateral ; arranged on one side.  
 Segment, ... the lamina divided by a sinus extending to the midrib or base of the blade.  
 Sepals, ... the leaves of the outer whorl of the flower. The three outer segments of the perianth in Orchids.  
 Serrate, ... the margin with the sinus and teeth sharp and turned towards the tip of the leaf, like the teeth of a saw.  
 Serrulatè, ... finely serrate.  
 Sessile, ... without a footstalk or petiole.  
 Setæ, ... bristle-like appendages.  
 Setiferous, ... furnished with setæ.  
 Setaceous, ... see *setose*.  
 Setose, ... having long, spreading bristly hairs.  
 Sheathing, ... the enlarged base of the leaf completely surrounding and sheathing the stem.  
 Sigmoid, ... S—shaped.  
 Sinus, ... a groove or cavity ; a division.  
 Sinuate, ... having divisions of the margin deeper than teeth, and with the sinus large and obtuse.  
 Spathaceous, ... having a broad spathe-like blade.  
 Spathulate, ... having the apex broad and rounded, and tapering down to the base, like a spatula.  
 Species, ... an assemblage of things classified or associated together according to attributes which they have in common and which bear a close resemblance or relation to each other.  
 Spicate, ... bearing spikes ; resembling a spike.

- Spike, ... an inflorescence in which the floral axis is elongated and simply bears sessile flowers, or flowers on very short, almost undistinguishable pedicels.
- Spur, ... a projection like a cock's spur. The prolongation of the base of the column of an Orchid backwards.
- Stamen, ... an organ bearing on its summit the anther, which contains the pollen.
- Staminode, ... see *Staminodium*.
- Staminodium, ... an abortive stamen, or an organ resembling an abortive stamen.
- Stellate, ... resembling a star ; radiated.
- Stigmatic surface, ... a viscous organ to which the pollen adheres and fertilizes the ovary.
- Stipes, ... the appendage of the pollinia in Vandææ, which differs from the *caudicle* of Epidendrææ both in origin and substance.
- Stipitate, ... stalked.
- Striæ, ... small, raised, longitudinal lines.
- Striate, ... marked with striæ longitudinally.
- Strigose, ... covered with *strigæ* or straight, hair-like scales.
- Style, ... the prolongation of the summit of the ovary which supports the stigma. A pin-shaped body.
- Styliform, ... having the shape of a style or pim.
- Sub— ... in composition signifies almost, slightly, rather, nearly.
- Subalate, ... slightly, or almost alate or winged, *i.e.*, the edges expanded into a membranous border.
- Subulate, ... awl-shaped.
- Succulent, ... juicy.
- Sulcate, ... having longitudinal furrows.
- TERETE, ... quill-shaped ; rounded throughout its length.
- Testa, ... the integument of a seed.
- Tetragonal, ... four-angled.
- Tetramerous, ... the perianth with only four segments.

Tomentose,	... bearing rather short, soft, matted hairs.
Trabeculate,	... furnished with cross bars of tissue.
Translucent,	... semitransparent.
Trapezoidal,	... having the form of a trapezoid or 4-sided figure having 2 of its opposite sides parallel.
Triandrous,	... having 3 distinct and equal stamens in the same flower.
Tricrural,	... three-legged.
Trifid,	... divided into three parts by two fissures.
Tripartite.	... divided into three parts by two partitions.
Trisected,	... divided into three parts by two segments.
Tripinnatifid,	... trebly pinnatifid. <i>See page 13.</i>
Tripinnatifid,...	trebly pinnatifid. <i>See page 13.</i>
Tripinnatifid,...	trebly pinnatifid. <i>See page 13.</i>
Trigonous,	... three-angled.
Triquetrous,	... three-cornered.
Trulliform,	... trowel-shaped.
Truncate,	... appearing as if cut off at the tip.
Tuber,	... a dilated portion of the root usually containing starch.
Tumid,	... enlarged ; distended ; protuberant.
Turbinate,	... top-shaped ; pear-shaped.
Turgid,	... swelled, distended.
UMBEL,	... an inflorescence resembling a corymb, but in which the pedicels are of equal length, and starting from the same point diverge like the ribs of an umbrella.
Umbellate,	... bearing umbels ; consisting of an umbel.
Umbonate,	... having a boss or elevated point in the middle.
Uncinate,	... hooked at the end.
Undulate,	... with the edges in rounded folds. The margin slightly sinuous and waved.
Unequal,	... when one side of the lamina is more developed than the other.

- Unguiculate, ... clawed ; as a petal suddenly contracted into a narrow base.
- Urceolate, ... pitcher-shaped.
- VILLOUS, ... bearing long, soft, close-set white hairs.
- Ventricose, ... bellied ; distended ; swelling out in the middle.
- Versatile, ... easily moved.
- WAVED, ... see *Undulate*.
- Whorled, ... set in a ring.
- Wart, ... a sessile gland containing solid secretions and forming a hardened spherical or other shaped appendage upon the surface of the epidermis.
- Woolly, ... bearing long, close, appressed and curly, but not matted hairs.
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